THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR
NOVEMBER 19, 1984
VOL. XVIII, NO. 47

Why buy?
Industry Spotlight
on equipment
leasing/17

In Depth
Who are end
users? ID/19

The other shoe
STC quarterly
report tells
all/73

Comdex host to myriad micro debuts

Show features few surprises

By Eric Bender
CW Staff

LAS VEGAS — While Comdex/Fall '84 saw hundreds of new microcomputer products fighting for the spotlight, the giant computer reseller show produced few major announcements and no blockbusters.

Unlike last year's show, when competing announcements of IBM Personal Computer-compatible systems and windowing software packages held center stage, no high-profile introductions dominated the conversation at Comdex/Fall.

The predicted crop of IBM Personal Computer AT-compatible machines did not materialize, but the show did display scores of new

See COMDEX page 13

DEC users get head start implementing Cobol-80

Supporters of proposed standard cite improved readability, maintainability, coding productivity

By Paul Gillin
CW Staff

As the computer industry continues its vigorous and lengthy debate over the nuances of the proposed Cobol-80 standard, a sizable body of Digital Equipment Corp. VAX users has been busily coding, using a compiler based on the unratified version. In recent interviews with *Computerworld*, several of these users praised many features of the new language and added that conversion from existing Cobol-74 programs has posed few or no problems.

Most users pointed to improved readability and ease of maintenance as the main benefits of the new implementation. They specifically said several new verbs, such as in-line PERFORM and EVALUATE, have improved coding productivity. In addition, other features that allow files to be defined externally have enabled programmers to write more modular and flexible code, they said.

"I'd guess we save 20% to 25% in development effort over Cobol-74, mostly because debugging and logic are easier," said Tom Sprawls, president of Gray Matter, Inc., a Phoenix-based systems house that does data processing for 10 companies. "Writing in Cobol-74 is a pain in the neck. But Cobol-80 has eliminated virtually all of the problems," he said.

Thury O'Connor, vice-president of Lexi-Comp, Inc., a small Hudson, Ohio-based software services, programming and facilities management firm, said,

See COBOL page 6

Sperry ties systems to Unix

Also releases supermicros, software at Comdex

By Edward Warner
CW Staff

LAS VEGAS — Sperry Corp. introduced AT&T's Unix operating system to most of its product line in one fell swoop here at Comdex/Fall '84 last week. It announced that Unix versions would be provided for nearly all of its computers, from its personal computers up to its 1100 mainframe series.

Along with that announcement, Sperry revealed its Series 5000 Unix-based supermicrocomputers and factory and office automation software to run on them.

At the low end, Sperry's implementation of Unix for its personal computers will come via Microsoft Corp.'s Xenix 3.0 Unix derivative. At the high end, the 1100 series will gain an AT&T Unix System V operating system called SX 1100.

SX 1100, priced at $1,000 to $1,500 per month, will reportedly execute as an application on the machine's 1100 OS standard operating system, providing access to 1100 OS formatted files. It will also reportedly be able to maintain multiple concurrent SX 1100 environments, each with its own file system.

Sperry will offer Xenix 3.0, meanwhile, for its Models 40, 45 and 50 Personal Computers and the hard-disk version of the Sperry Portable Personal Computer. It is said to require 512K bytes of random-

See SPERRY page 11

A license to save on software

By Paul Gillin
CW Staff

SAN DIEGO — North American Philips Corp. has found a novel and efficient way to save hundreds of thousands of data processing dollars. It licenses only one copy of each of seven financial software packages and makes them available to its 19 subsidiaries.

In that manner, North American Philips not only saves licensing costs, but also employs a much smaller maintenance and education staff for its widely diversified business. In fact, it needs only 11 people to support the applications software for 19 subsidiary companies, explained Kenneth Ary, a financial package coordinator for North American Philips. Ary, who is based at Philips' offices in Itasca, Ill., estimated the company saves 65 programmer-years per year under the arrangement. Ary was interviewed at the 15th Software International Users Group meeting held here last week.

There is nothing illegal about the arrangement. Divisions simply load executable versions of the software into their on-site mainframes from the firm's New York data center for on-line data entry. The data is then formatted to update the data bases at the local sites. Not only does the company save money, but the arrangement also allows it to install new

See SAVE page 6

TOP OF THE NEWS

A first user of IBM's DB 2 relational data base management system had no major problems using it to query a 1.5-million-record data base. Page 4.

■

All that Jazz. Lotus Development Corp. skipped Comdex last week, but made news there anyway by announcing Jazz, a five-function integrated package for Apple Computer, Inc.'s Macintosh. Page 6.

■

On the up and up. Data processing operations managers are enjoying salary increases this year that are larger than those of other operations managers. Page 6.

■

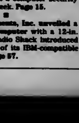


Photo by D. Waite

Stuck in a rut. That's where Comdex keynoter John Sculley placed the personal computer industry. Meanwhile, Sperry Corp. unveiled a superminicomputer at the Las Vegas extravaganza. Page 11.

■

Computer technology isn't keeping pace with security threats to computer systems. At least that was the opinion of some attendees at a computer security conference last week. Page 15.

■

Texas Instruments, Inc. unveiled a 10½-lb laptop computer with a 12-in. display, while Radio Shack introduced another member of its IBM-compatible micro family. Page 57.

IRS seeks system to monitor media reports

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Internal Revenue Service is advertising for an "on-line automated media diagnostic system" that would help IRS press officers do a better job of feeding the news media statements on federal tax regulations.

The computerized system the IRS has in mind — and which officials concede may not exist — would monitor print and broadcast reports to see if the IRS message is getting across to U.S. taxpayers, according to IRS officials and documents. The agency is now searching for a private firm with media analysis experience that can supply such a system.

"Since we don't own the media, we need to find out how best to reach them and communicate with them," said Mike Williams, an analyst with the IRS taxpayer information program. The system is expected to "measure changing IRS objectives and messages . . . against what was actually used [by the media]," an IRS statement said.

For example, the "media diagnostic system" could help press officers determine which publications actually use IRS press releases and identify what format or timing changes are needed to get the information reported, Williams said.

Asked if the system would be used to manipulate the press, Williams responded, "That's why it's called 'media diagnostic system' and not 'media management system.' . . . The opportunity for abuse is out there, but that's not what we intend to do."

> *'The opportunity for abuse is out there, but that's not what we intend to do.'*
> — Mike Williams, IRS

In a solicitation published in the government's *Commerce Business Daily*, the IRS said it seeks an "operational, on-line, automated media diagnostic system for 85 sites throughout the nation that will allow IRS management to determine the effectiveness of its nationwide taxpayer information program."

The IRS said the computer system should supply detailed statistical reports and graphics that will help IRS management measure "the impact of IRS materials on the media, the value of media coverage, the type of audiences reached, media news preferences, the need for localization of media releases and the best distribution methods."

Furthermore, the IRS said, the system must provide categorized mass media listings and must be available to users — the press officers — seven days a week, 24 hours a day.

Williams said the IRS apparently is the first federal agency that has tried to automate its media relations effort. "We're pioneering in this area," he said.

But Williams said it remains an open question whether the solicitation will turn up any vendors that can supply the computer system the IRS wants. If none surfaces by early December, the plan will be dropped, according to Hiram Wilcox, an IRS contracting officer.

Williams stressed that the automated system would help the agency's 63 public affairs officers communicate more efficiently and effectively with the nation's 40,000 media outlets.

Datapoint rolls out 32-bit supermicro

By John Desmond
CW Staff

LAS VEGAS — Datapoint Corp. last week announced a 32-bit supermicrocomputer for the office automation market based on dual microprocessors and featuring a Unix look-alike operating system.

Called the Datapoint 3200, the supermicro uses dual Motorola, Inc. 68000 microprocessors and runs Charles River Data System's Unos AT&T Unix-like operating system. It allows connection of up to 28 terminals.

The 3200 is compatible with Datapoint's Attached Resource Computer (ARC) coaxial-cable local-area network and supports Ryan-McFarland Corp.'s RM/Cobol relational data base management system.

In the 3200 hardware, one 68000 processor with a 4K-byte cache memory is dedicated to all applications processing; the other is dedicated to I/O operations, a feature said to result in better response time. Main memory is expandable to 8M bytes, and on-line storage is expandable to 152M bytes, according to the company.

The 3200 interfaces with the ARC network via Datapoint's Intelligent Network Executive-32 (INX-32) Adaptor, an optional internal card and accompanying software. Software utilities reportedly allow ARC users to perform tasks in the Unos context and use the results in their own applications.

The Unos operating system is said to provide file management facilities including multitasking, device-independent I/O, I/O redirection, dynamic file allocation and hierarchical directory structure.

Software options available include the C programming language, RM/Cobol and Databus, Datapoint's business programming language. These are said to provide access to many independently developed application packages. RM/Cobol, previously unavailable on the ARC, is said to allow users to maintain single entries of data and to access required information from a single source.

Ace Microsystems, Ltd.'s LEX word processing program and Microsoft Corp.'s Multiplan spreadsheet are also supported by the 3200, the company said.

An entry-level 3200 includes 1M byte of memory, 32M bytes of disk storage with 1M byte of diskette storage, a 4K-byte cache memory and four serial ports. A choice of three types of terminals, three types of printers and a communications adaptor to emulate IBM's 2780/3780 protocols is available.

The base system is priced at $15,430. The price for Unos is $1,000 and for the INX-32 Adaptor with software, $2,500. The system is available 90 days after order, the vendor said.

Datapoint is located at 9725 Datapoint Drive, San Antonio, Texas 78284.

NEWS SUMMARY

A division of General Motors Corp. has plunged headfirst into relational data base management by becoming a first user of IBM's DB 2 data base management system/4

Lotus Development Corp. launched Jazz, an integrated software package for the Apple Computer, Inc. Macintosh, last week/6

DP operations managers are said to be experiencing higher salary increases than other operations managers this year/8

CW at Software International Users Group: Packaged software installation can go more smoothly if DP and user departments define each other's responsibilities, one user said . . . Looking ahead before installing an application can keep software running for years, according to another user/**9-10**

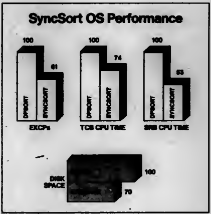
CW at Comdex/Fall '84: Sperry Corp. chose Comdex as a stage to unwrap, among other products, its 7000/40 32-bit superminicomputer . . . Apple Computer, Inc.'s chief sees innovation as the only way the microcomputer industry can escape its present rut . . . Micro managers looked to Comdex as a way of staying a step ahead of the continuing technology explosion/**11-13**

CW at Computer Security Conference: Only a concerned coalition of government, industry, users and consumers can stem the tidal wave of computer crime, according to GTE Telenet Communications Corp.'s chief . . . While they give security product vendors an 'A' for effort, most visitors here did not think technology is keeping pace with the threats to computer systems . . . When designing computer system security, users had better consider their security's security, one expert said/**14-16**

Industry Spotlight: The computer leasing market/**17-23**

CW at Data Training: Sensitizing employees to the importance of data security is essential to preventing computer crime/**24**

CW at Fosc: One speaker gave tips on buying and installing local-area networks . . . Electronic mail and electronic funds transfer pose a security threat, experts warned/**26-27**


SyncSort OS Performance
100
61
DFSORT
SYNCSORT
EXCPs
100
74
DFSORT
SYNCSORT
TCB CPU TIME
100
53
DFSORT
SYNCSORT
SRB CPU TIME
DISK SPACE
100
70

Early user harbors ambitious plans for IBM's DB 2

FIRST USER

By Paul Gillin
CW Staff

The Buick Motor Division of General Motors Corp. is plunging headfirst into relational data base management, and its product of choice is IBM's DB 2.

With more than 20 months of DB 2 experience under its belt, Buick is ready to start using the data base management system (DBMS) on some ambitious applications (see story below)."I think DB 2 will get a serious look from now on for every application," said Lowell Watson, administrator of new technology studies at Buick.

The first release of IBM's long-awaited relational DBMS has some shortcomings, Watson said, but he is largely pleased with both its performance and features. "We're happy with it. The code is clean, and it's very good for such a young system and a large system," he said.

DB 2 has the greatest potential for prototype development of end-user-type applications that require frequent query and report writing. "Programming productivity is definitely up," he said. "You have more interaction with the customer, and at the end, you're much more likely to have something he's happy with than in the traditional life cycle approach. It's much more forgiving [than IBM's IMS] in the way you put the data base together."

However, he said, Buick is not planning to move any major applications to DB 2 from IMS in the foreseeable future.

The focus of DB 2 usage at Buick is a large production program used by the personnel department to handle sickness and accident claims. The system tracks claims and actions taken on those claims and maintains a six-month history file of time and attendance data. It also has extensive query facilities using the Query Management Facility utility of DB 2 and includes a tickler file for claims analysts. Written largely in PL/I, the program uses files extracted from three IBM Vsam data bases loaded into a fourth production file that is maintained solely on DB 2.

Currently, the time and attendance data base consists of 1.5 million records. When the history file is complete, it will comprise about 2.5 million records. "So far, we're confident it can handle this application up to 2.5 million rows. We are getting 3 to 5 second response times," Watson said. However, he stressed, "You have to remember we're not updating that table. It's just being queried by the applications program or by the user."

Examining DB 2 limits

Buick is bound by a nondisclosure agreement not to discuss specifics of DB 2 performance, but Watson said, "We are working heavily in that area. We're trying to figure out how far we can push [DB 2]," he said.

"Performance has to be worked on and IBM knows that," he said. "IBM will tell you that in the first release they did not work on performance. The main thing was to make the code clean and make it do what they advertised. They're saying the next release is going to concentrate on performance."

The biggest area of concern is in updating. Watson said Buick has not tried updates on tables larger than 100,000 records. However, "It's clear we can handle all that stuff down in the hundreds of thousands," he said.

So far, extracts have come primarily from Vsam files using IBM's DXT data extract facility. "DXT is a pretty good extracting tool for getting data out of Vsam or IMS or other kinds of data collections if the data is laid out flat," Watson said. "The language you use is a Sequel-like language. It picks data up with great selection. However, when it lays it down, there are no choices you can make about how the updates are done. So in some cases, we have to write some PL/I programs where we have to do some more selective kinds of updates."

Buick had considered several fourth-generation languages in its initial foray into relational processing. But Watson said the relative weakness of the data base handling was a factor against them. "We were looking for something more fundamentally different and structured, not the best report writer on the market," he said.

DB 2's use of SQL was a major factor. "I've been trying to convince other people that it's best for the whole industry to standardize on a language," Watson said. "[SQL] looks like a reasonable standard, and IBM will make it a standard anyway. Why go off on one of these tangents for a while and then come back?"

Once inside DB 2, Sequel Processing Using File Input (Spufi) can be used by programmers in application development to insert data base queries. "If you're writing a program in PL/I and you're editing the file, you can split-screen to your Spufi session and then write the query that you think is appropriate to be included in your program," he said. Buick uses Spufi in an IBM Interactive System Productivity Facility environment for DB 2 development.

Watson said DB 2 has imposed no limits on the variety of record types that programs can use. "You cannot support a one-bit kind of record type that you could in PL/I," he said. "But you have fixed-length character, variable-length character, packed, small integer and float. Most of the data types you have in PL/I you have in DB 2."

Watson said DB 2 is a good first release but needs some enhancements. Buick presented a large document of proposed additions and modifications to IBM at a customer roundtable last year. Watson said IBM appears to be tackling most of the significant needs that were expressed.

Want to stay competitive? Add chief information officer

CHICAGO, Ill. — Chief executive officers and chief operating officers who want to remain competitive will have to incorporate a new title into their management system, according to Arthur Andersen & Co.

In a handbook for executives entitled "Trends in Information Technology: 1986," the accounting firm predicts that the emergence of the chief information officer at the top executive level is essential to survival.

"The corporate role in establishing an information infrastructure and in setting policies and standards for its use must increase," said P. Declan O'Riordan, a senior partner who directed the preparation of the executive handbook.

"With the decentralization of the traditional MIS group, new systems development methods and the rapid convergence and overlapping of technologies, one senior official should be able to correlate information technology and business strategy for the organization's advancement," O'Riordan said.

Along with the emergence of the information executive, the firm predicts an increase in the use of information systems as marketing tools.

Arthur Andersen plans a monthly update of the free handbook which can be obtained at any local Arthur Andersen office.

Second-class postage paid at Framingham, Mass., and additional mailing offices.

Computerworld (ISSN-0010-4841) is published weekly, except: January (6 issues), February (6 issues), March (5 issues), April (7 issues), May (5 issues), June (7 issues), July (6 issues), August (6 issues), September (7 issues), October (7 issues), November (6 issues), December (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed; write to Circulation Dept. for subscription information.

Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701. ISSN 0010-4841/84 $3.00 + $.50. $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

ABP mcc

POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, Circulation Department, 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

Lotus offers software for Apple's Macintosh

Jazz package targets corporate users; functions resemble Symphony's for IBM's micro

NEW YORK — Lotus Development Corp. introduced last week its Jazz five-function integrated software package for the Apple Computer, Inc. Macintosh in a move designed to entice corporate users to embrace Macintosh.

Jazz reportedly offers functions found in Lotus' Symphony package for the IBM Personal Computer, including word processing, spreadsheet, data base management, communications and business graphics, but Lotus Chairman Mitchell D. Kapor stressed that Jazz is "in no sense a rework or expansion of [Lotus'] 1-2-3 or Symphony."

Priced at $595, Jazz will reportedly be available in March 1985. It will run only on the 512K-byte version of the Macintosh, introduced in September, and requires a second disk drive, priced at $495.

Jazz reportedly allows users to execute functions using the pull-down menus common to Macintosh software in conjunction with either the machine's keyboard or the Macintosh mouse. Each application is said to function either as a stand-alone program or as an integrated, and even windowed, program within other applications in the package.

For that reason, Kapor refused to specify how much internal memory the program occupies, saying "how much room you have is a function of what [application] you're doing with it."

Jazz's communications program reportedly supports Digital Equipment Corp. VT100 and VT52 terminal emulation and can also convert Multiplan, 1-2-3 or Symphony files, transmitted from the IBM Personal Computer to the Macintosh, into a format that Jazz can use.

> *'Macintosh has had zero momentum in the corporate marketplace, but Jazz will make [the Macintosh] a more attractive offering without a doubt.'*
>
> — Tony Morris, Morris Decision Systems, Inc.

Calling Jazz a product "for the forgotten managers of business, for those users who are not spreadsheet junkies," Apple Computer President John Sculley told the 200 or so who attended the introductory press conference that Jazz will come to have the same impact as Software Arts, Inc.'s Visicalc and Lotus' 1-2-3.

Financial analyst Scott Smith of the Gartner Group, a market research firm in Stamford, Conn., meanwhile, acknowledged that Lotus is "positioning [Jazz] very strongly for the corporate world," but wondered if corporate users really want integrated packages at all.

The cafeteria approach

His firm's research, he said, shows they prefer what he called "the cafeteria approach" of chosing selected software applications that can share data, particularly in a windowed environment.

"The [Macintosh] is out of the woods," as far as sales to corporations go, said retailer Tony Morris in reaction to the announcement.

Morris, whose New York-based Morris Decision Systems, Inc. sells personal computer hardware and software solely to corporate clients, said that, so far, "Macintosh has had zero momentum in the corporate marketplace," but that Jazz "will make [the Macintosh] a more attractive offering without a doubt."

COBOL from page 1

"When I had a choice in the past, I have always gone toward a scientific language like Fortran or Algol. I developed a strong anti-Cobol bias. But I'm surprised and satisfied with Cobol-80. We've been able to do everything we wanted to do."

Users said Cobol-80's new EVALUATE verb, which allows for testing of multiple conditions and specification of multiple control branches, has been one of the most helpful features of the new implementation.

"We've found that after you get past three levels of IF statements, nobody can keep up with where you are," Sprawis said. "EVALUATE eliminates having to write a lot of IF statements."

O'Connor said the EVALUATE statement has enhanced readability and maintainability of Cobol code. "It's also very economical of characters," he said. "Because of built-in control, I can use selection alternatives and not have to bury them in a bunch of IFs and GOTOs."

The new procedure cuts down on the complexity of debugging programs containing many IF statements, Sprawis said. Previously, a single period could end a series of nested IF statements. In Cobol-80, internal IFs can be ended with an END statement without affecting external IFs. "If it's [3 a.m.] and your payroll's down, it can drive you crazy looking for that little period," he said. "That's been eliminated in Cobol-80."

Users said EVALUATE and in-line PERFORM are so useful that they rewrite Cobol-74 programs whenever possible to take advantage of the new statements. "When you PERFORM a section, it executes a whole section of code," said Nancy Torok, a programmer/analyst at Amax Copper, Inc., a metals trading company in Carteret, N.J. "That makes it easier to document."

A particularly useful new feature for Amax's shop has been the advance ACCEPT and DISPLAY commands. The DISPLAY statement now can be used to display a message and add a new phrase at the end with no advancing.

Control over prompts

"The old system was a prompt and response mode that proceeded line-by-line," Torok said. "In this new way, you can choose how you want the prompt to be displayed, specifying lines and columns. That's useful for prompting on data input screens. Now you can do that in a full-screen mode."

Sprawis has found the new PERFORM WITH TEST AFTER statement to be useful in eliminating problems caused by unfinished subroutines. If any subroutines are accidentally left open, they are closed when the program is exited. "That was a real 'gotcha' in Cobol-74," he said. "I'd say 20% of the bugs I've run into have related to a flag that hadn't been cleared."

Two users found the new REFERENCE MODIFICATION statement useful because it allows individual characters within a string to be accessed from the procedure division without having to be defined in the data division. "This feature is invaluable to us," O'Connor said. "In effect, it allows us to treat substrings of long fields just as if they were part of a standard reference definition. The reference-modified fields are indistinguishable from regular fields."

Nesting whole programs

Cobol-80 also contains new procedures for nesting whole programs, a feature that can be used to construct more modular and maintainable applications, users said. When this is combined with VAX VMS features, "you can write a large system with a lot of program modules that call each other and bind on the fly into one image," Sprawis said. "It makes it possible to write applications in a very modular form."

O'Connor said the capability provides the means to share data and pass parameters between calling and called programs.

"Complete programs can be contained in other programs and also executed as separate programs," he said. "They behave as independently compiled programs although you keep and maintain them as a single unit."

Users unanimously said they had experienced few problems in running existing Cobol-74 programs on the new compiler.

"If you want to write Cobol-74 using the Cobol-80 compiler, you can do it. There's even a flagger that will show you where you're departing from it," Sprawis said. "But if you do so, there are a lot of new and great things available now that you will be missing."

WASHINGTON UPDATE
Mitch Betts
CW Washington Bureau

VA program identifies benefits overpayments

WASHINGTON, D.C. — The Veterans Administration (VA) this month began a computer matching program to detect overpayments of veterans, benefits, such as pensions and educational aid.

The VA Inspector General's Office said it will match its benefit records with vital statistics records kept by 47 states (three states lack automated records) to "identify recipients who may be ineligible or not fully entitled to such benefits." For example, the VA noted that the spouse of a disabled or deceased veteran is not entitled to full benefits in the event of a divorce or remarriage.

In other recent announcements required by the Privacy Act of 1974, the government said:

- The Federal Bureau of Investigation's National Crime Information Center will routinely disclose information about missing children to the National Center for Missing and Exploited Children.
- The U.S. Department of Energy will routinely disclose health information about employees handling radioactive materials to the National Institute of Occupational Safety and Health for studies on radiation exposure.

Florida residents to test OMR 1990 census forms

WASHINGTON, D.C. — The U.S. Bureau of the Census plans next year to test census forms that can be read by optical mark recognition (OMR) scanning equipment in an effort to evaluate automated processing methods for the 1990 census, according to Census Bureau documents.

The bureau said it will test the OMR census forms in March 1985 in Tampa, Fla., as part of a pretest for the nationwide census in 1990. Eighty percent of the Tampa households sampled will fill out the OMR form, while 20% will use the regular census form that requires clerical data entry for computer tabulation.

The OMR form requires respondents to use a No. 2 lead pencil to blacken circles corresponding to the correct answer.

Air Force plans AI system to diagnose aircraft ills

WASHINGTON, D.C. — The U.S. Air Force plans to develop a prototype artificial intelligence system for aircraft maintenance that is expected not only to assist with repair diagnosis, but also to help train new mechanics, officials announced recently.

The announcement from the Training Systems Division of the Air Force Human Resources Laboratory at Lowry Air Force Base in Colorado said the research project will develop a diagnostic expert system with features that would help apprentice mechanics learn the problem-solving techniques of master mechanics.

The Air Force plans to award an R&D contract next summer. "The goal of this research is to design, develop, demonstrate and [make the transition to] artificial intelligence technology, which integrates automated diagnostics, maintenance technician expertise and maintenance information data bases," the statement said.

The system would draw on data bases generated by a computer-aided design and manufacturing system as well as the heuristic knowledge of expert technicians, according to the announcement.

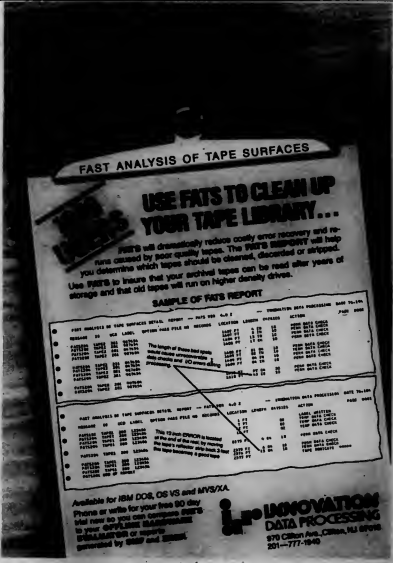
AT&T exec to address conference

BALTIMORE, Md. — Donald Procknow, vice-chairman of AT&T Technologies, Inc., will deliver the keynote address — entitled "Doing Business Electronically" — when the World of Electronic Data Interchange — 1984 Forum and Exhibit convenes at the Convention Center here Nov. 28 and 29.

The conference, sponsored by the Transportation Data Coordinating Committee (TDCC), will focus on the latest developments in computer and communications applications that use the Electronic Data Interchange standards for computer-to-computer transmission of intercompany business transaction data. The sponsor said industry standards and the transmission and receipt of purchase orders, invoices, bills of lading, freight bills, warehouse instructions, shipment status and payment claims will be discussed and demonstrated at the conference.

Other scheduled speakers will include R. W. DeSio, director of IBM's Corporate Technical Institutes, and Dr. James Boren, president of the International Association of Professional Bureaucrats. The conference will also feature 16 technical clinics covering topics on planning, programming and the implementation of modern electronic data interchange systems.

Conference registration is $295. TDCC headquarters is at Suite 606, 1101 17th St., N.W., Washington, D.C. 20036.



DP operations managers lead in salary gains

GARDEN GROVE, Calif. — Data processing operations managers are experiencing an increased salary differential this year over other operations managers, indicating "a much higher level within the management hierarchy than previously," according to a forthcoming survey by the Association for Computer Operations Managers (Afcom).

The 1984/1985 Data Processing Salary Survey, based on data from about 180 computer installations nationally, reveals that the salary gap between the DP operations manager, a relatively new but emerging position, and the computer operations manager increased from 16.7% last year to 22.8% this year.

One reason for the increase, according to Afcom President Leonard Eckhaus, "is that a number of data centers across the country are reorganizing their operations, incorporating the position of data processing operations manager."

While DP operations shops were traditionally run by the computer operations manager, the newer position indicates the top DP operations person is now at a much higher level in the DP management hierarchy and is beginning to find salary compensation on a par with programming managers in many companies, according to Afcom.

Salaries for data entry managers and data control managers closed the gap somewhat with the traditionally higher salaries for computer operations managers, a spokesman for Afcom said, indicating "a movement towards more of an equalization of the salaries" for managers grouped under the DP operations manager. The total spread between salaries for data entry, data control and computer operations managers dropped to 21.9% in the most recent survey, from 31.5% a year earlier. Afcom cautioned that "one year's data does not in itself represent a trend."

The top DP operations person is at a much higher level in the DP management hierarchy and is beginning to find salary compensation on a par with programming managers.

Nationally, the monthly salaries for DP operations managers ranged from a low of $1,680 to a high of $7,083. The average monthly salary was $3,301 and the median monthly salary was $3,250.

Regionally, DP operations managers earned a higher average monthly salary in the Northeast, $3,433; followed by the West, $3,310; South, $3,183; and Midwest, $3,128.

Computer operations managers nationally earned from a low of $1,358 per month to a high of $6,256, with an average of $2,547 and a median of $2,434. Regionally, average monthly salaries were highest in the West, $2,747; followed by the Northeast, $2,609; South, $2,367; and Midwest, $2,217. Median salaries were essentially equal in the Northeast and the West.

Data control managers salaries nationally ranged from a low of $1,284 per month to a high of $3,800; the average salary was $2,229 and the median salary was $2,277. Regionally, the average salary was higher in the West, $2,402, than the Northeast, $2,210, but the median salary was higher in the Northeast at $2,385 compared with $2,264 in the West. Average salaries for the other areas were $2,268 in the Midwest and $2,193 in the South.

Monthly salaries for data entry managers ranged nationally from a low of $1,000 to a high of $3,800; the average was $1,989 and the median salary was $1,900. Regionally, the average salary was highest in the Northeast, $2,021; followed by the West, $2,014; South, $1,978; and Midwest, $1,838. The median salary was slightly higher in the Midwest than the South.

Projected salary increases for 1985 averaged 7.5% for DP operations managers, 7.0% for computer operations managers, 6.9% for data control managers and 6.4% for data entry managers.

Data entry staff largest gain

Overall salary increases for all employees in the DP shops rose 7.8% over the previous year, according to Afcom, with the largest increase among data entry employees, 9.2%, followed by data control employees, 8.7%, and computer operations employees, 5.0%.

Of 19 job classifications included in the survey, DP shops reported some difficulty in recruiting for 11 of those classifications. The greatest difficulty was filling the position of scheduler, which was cited by 89.9% of the survey respondents. Other positions were: DP operations analysts, cited by 80%; DP operations manager, 75%; senior computer operator, 68%; data control manager, 66.7%; and data control shift supervisor, 66.7%.

The survey, which also breaks down salaries by installation size and for all 19 job classifications, is available for $40 from Afcom, Suite 201, 11601 Brookhurst, Garden Grove, Calif. 92640.

SAVE

from page 1

releases of the applications in much less time.

Ary's group administers the company's Software International Corp. applications, including general ledger, fixed assets and accounts payable. Other groups within North American Philips perform similar functions for a Uccel Corp. Carms accounts receivable system and Insci Corp.'s payroll and human resources software.

The arrangement works like this: North American Philips maintains two IBM 3081 mainframes running IBM's VM operating system at its New York data center. The data center also runs 14 copies of IBM's DOS operating system under VM, as well as a copy of IBM's OS operating system. The widely scattered divisions of North American Philips each maintain their own IBM mainframes, but without any copies of the applications running locally.

Instead, the New York data center maintains core image, source statement and relocatable libraries of the applications at the New York site. When a division wants to update its financial files, it downloads a runtime module of the application over leased or dedicated lines to its mainframe for on-line data entry.

When the update is completed, the data goes through a monitor that Philips wrote in Cobol. The monitor is basically a data collection utility that takes the update data and creates the IBM JCL for batch update. "The user doesn't have to figure out what to run and in what order," Ary said. "The conversion program takes that over for him."

The batch updates are done directly into the user's data base, which is maintained locally. In this way, the users own their data, but not the applications needed to use it. Users do run some of their own applications locally, but the "bread and butter" financial data is all handled through the remote linkup.

Ary explained that the procedures ease the process of converting to new versions of the applications software. But because 19 divisions will use the package, the new releases must be tested much more thoroughly. "If something isn't tested very well, it can bring everyone down," Ary said.

North American Philips uses an internal beta site approach. When a new release comes in, it is tested using a copy of production data extracted from the chosen beta site. The software is then retested against a file of errors that have been found in the past.

Then the beta test site is brought up on the production system under the administration of the application support staff and runs for 30 to 60 days. A duplicate global library containing the new version of the software is kept and run parallel with the previous version. Moving a division over to the new release is as simple as switching pointers, Ary said.

The divisions are notified well in advance of conversion to a new release, Ary said. Staff members from the application support group travel to the divisional locations to train users in the new features of the software. "The easier we can make the system for the users, the happier they'll be," Ary said. "We want the users to know something about data processing, but as little about the complexities of the system as necessary."

User, DP cooperation key to package's productivity

CW AT SI
USERS GROUP

By Paul Gillin
CW Staff

SAN DIEGO — When installing a new financial application package, "the real concerns are not the big heavy technical ones. They have to do with people working together."

That was the essence of a presentation by Carl Coulter, a systems planning consultant in corporate business systems development at McGraw-Hill, Inc. in New York, at the 15th Software International Users Group Conference held here last week.

Coulter, who has been involved in several installations of packaged software, said a financial software installation project differs markedly from that of standard DP applications. "General ledger is very much an accounting system, and the goals of those people in accounting often don't coincide with the goals of DP," he said.

'My system,' not 'your system'

A major goal of the DP staff should be to have the user referring to the application as "my system" rather than "your system" by the time development is well under way, Coulter said. For that reason, the user should drive the process throughout the life of the development cycle.

Perhaps the most important commitment corporate management must make is in the area of personnel. "Accounting people tend to think all you have to do is push buttons and things happen in DP," he said. "It's hard to believe people think you can make a conversion without increasing the people commitment. Your management has to understand the resources you need to install or convert."

Coulter said that when he was at Home Box Office (HBO), a division of Time, Inc., the manager of accounting held weekly meetings to check on the progress of an accounts payable and general ledger installation effort.

"If we needed people, he made sure they were available," he said. In return, DP was expected to meet the accounting department's ambitious deadlines.

Both the user and the DP sides of the project management team must define their roles and stick to them without attempting to do the other department's job, Coulter said.

■ DP should develop the conversion plan, identifying interfaces from other financial systems and setting realistic time frames.

■ It should interact with the user decision-makers. "This is key," Coulter said. "It's very important to know who makes the decisions, who pays the tab and who expects results."

■ It is also up to DP to maintain a relationship with the software vendor that enables the user company to take advantage of the vendor's services when needed.

■ DP must install and test the software, making sure all documentation and instructions are present and that the software is installable.

■ DP must bring the system to operational status.

To make the last two steps easier, do some up-front planning, Coulter said. Set standards for job control language (JCL) and do not modify JCL at first. "You want to make sure the package is installable," he added. Retain identification codes for programs and job streams that are similar to those used by the vendor. That makes error tracking easier than if entirely different identifiers are used, he explained.

One should also bring the system into operation in line with the needs of the user, Coulter indicated. The user may want to build a history file by converting existing data or simply by starting fresh, he added. Building interfaces to existing systems and methods is important in order to bring data over that is in line with the user's expectations.

Coulter

Users, for their part, should be responsible for training their own people, according to Coulter. They should create their own report formats. At HBO, users hired two consultants strictly to build reports. Users will want to define their own control and security systems and should plan for conversion so that it dovetails with the expectations of DP, he said.

In addition, users must be solely responsible for defining their own chart of accounts and relationships and for deciding how data should be captured and maintained, Coulter added. All these steps should be taken without extensive DP involvement. The user will not feel he owns the system unless he has defined in detail how it will work, he explained.

According to Coulter, the end result of coordination between DP and user departments is reduced personnel costs, which are by far the most expensive aspects of installation or conversion.

NEWS

Planning keeps package running problem-free for years

CW AT SI USERS GROUP

By Paul Gillin
CW Staff

SAN DIEGO — Donald Willis has never had to grapple with the "make or buy" decision of application software during his 13 years at the Capital Group, Inc. in Los Angeles. Willis, who is manager of corporate accounting, joined the Capital Group in 1971 when the company was in the middle of the process of installing a general ledger package from Software International Corp. (SI).

Thirteen years and four major releases later, Willis is still an advocate of packaged software. The choice seemed natural for the Capital Group in 1971 as it entered a period of aggressive growth. The packaged solution offered faster installation than an in-house-developed system and greater flexibility than any alternative, he said in an interview at the 15th Software International Users Group Conference held here last week.

The Capital Group is an investment management and research company that owns several other subsidiaries worldwide. Subsidiaries include Capital Research and Management Co., Capital Management Services, Inc., Capital Guardian Trust Co. and international affiliates in Europe. An IBM 4381 computer at the company's Brea, Calif. headquarters processes virtually all corporate financial accounts. Individual customer accounts are maintained by a service bureau.

The packaged application has operated so smoothly that Willis said it ran virtually maintenance-free between 1972 and 1981, when the Capital Group converted from Version 3 to Version 4 of the general ledger package.

The secret lies in the fact that 13 years ago some very astute accountants did some very careful planning, he said. "If you think it out on the front end, [the package] should serve you for years and years," he said.

Unfortunately, a common problem of package installations that many DP departments must fight is the unwillingness of corporate management to acknowledge the difficulties involved. "Management often thinks of a package as if it [were] a lamp," he said. "You should be able to just plug it in and have it work."

The truth is quite the opposite, he said. Installing a software package does not offer much leeway for changes during development. As a result, the package has to be selected and implemented with an eye toward the long haul.

Estimate growth paths

A critical planning element is estimating growth paths, he said. If your company is planning to double in size over the next 10 years, you need a package that allows you to add many new relationships, and logic that will let you customize the software to handle the accounts the way your business handles them.

That effort can also pay off in ease of installing new releases. The Capital Group has been able to bring up new versions of the general ledger over the years with few visible changes, he said. "In some cases the users don't even know the conversion has been made," he said. A key element is knowing the new release before trying to install it.

When implementing a new release, the Capital Group does not use the only copy of its live data. Production data is backed up prior to the change. Conversions should be made during the off-season or during holidays when work is likely to be slow, he said.

Steady contact with the vendor is critical both during conversion and in day-to-day operations, Willis said. "User conferences are one of the best ways I know to meet the vendor," he said.

Sperry launches 7000/40 32-bit superminicomputer

Machine supports up to 128 users, targeted to compete against DEC VAX-11 superminis

By Edward Warner
CW Staff

LAS VEGAS — Sperry Corp. last week chose the world's largest microcomputer show as a stage to unwrap a 32-bit superminicomputer supporting up to 128 users and designed to run AT&T's Unix operating system and the C language.

The Sperry 7000/40, announced at Comdex/Fall '84 here, will be manufactured by Computer Consoles, Inc. and will reportedly feature an AT&T Unix operating system and main memory capacity of between 4M and 8M bytes.

Priced between $160,000 and $300,000, depending on configuration, the 7000/40 will also reportedly offer independent processing for instruction decoding, address generation and instruction execution, allowing the system to process three instructions simultaneously. First shipments are slated to begin Feb. 2.

The 7000/40, Sperry officials said, is targeted to compete with, among others, the Digital Equipment Corp. VAX-11 superminis, including the recently introduced 8600 series.

"VAX users who are looking either to upgrade their system or standardize on a VAX Unix product can now have the option of migrating to the Sperry family," according to Dewaine Osman of Sperry's Americas Division.

Initially, the 7000/40 will support the University of California at Berkeley Unix 4.2 operating system, but Sperry's director of microsystems and commodities marketing, Neal Waddington, said that by mid-1985, AT&T's Unix System V will also be available.

The former operating system will make the machine attractive to the scientific market, while the latter — which provides IBM interconnect ability — will enhance its appeal to commercial users, Waddington observed. Berkeley Unix 4.2 for the 7000/40 will be priced from $10,000 to $22,500, depending on the number of users.

Other features of the 7000/40 are a separate subsystem for the CPU, main memory and I/O and four-way interleaving of its memory capacity, said to permit several controllers to access memory simultaneously.

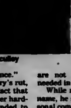
Sperry Corp. can be reached through P.O. Box 500, Blue Bell, Pa. 19424.

Apple's Sculley: Innovation will shake micro doldrums

CW AT COMDEX/FALL '84

By Edward Warner
CW Staff

LAS VEGAS — Abandoned by investors and shaken by the shakeout, the personal computer industry is trapped in a giant rut that it can escape only through innovation, said Apple Computer, Inc. President John Sculley in his keynote address opening the Comdex/Fall '84 show here.


Sculley

That innovation, Sculley indicated, will come from the software world because the personal computer has "begun the transition from a hardware machine to a software appliance."

Contributing to the industry's rut, the Apple chief said, is the fact that the shakeout of microcomputer hardware makers has now expanded to include software publishers and makers of computer peripherals. To get the industry back on track, he added, innovation will be needed, and "innovation must be market-driven to be successful."

Sculley, who joined Apple a year and a half ago, also had some thoughts to share about innovation as it pertains to his firm's continuing battle with its Big Blue nemesis. When told shortly after his arrival that Apple should seek IBM compatibility or a non-IBM dominated market niche, Sculley said he responded, "I get my satisfaction from being a dreamer, a builder and a leader."

He later remarked that IBM compatibility will become harder and harder to achieve, citing as evidence the arrival of the IBM Personal Computer AT and the announcement of IBM's upcoming Topview windowing environment.

Sculley argued, however, that size is not enough to ensure success, pointing to the minicomputer makers and AT&T, which he said are not providing the leadership needed in the industry.

While not mentioning his firm by name, he said the leaders of the personal computer industry "will not resort to mass merchandising, but will work with their dealers as partners."

In his speech, Sculley blasted the venture capital investment community, which he said "has turned away from the biggest growth industry."

SPERRY from page 1

access memory and a 10M-byte hard-disk storage unit and will cost $395.

Also introduced were versions of Unix for the Series 5000 supermicros and the firm's new Series 7000/40 superminicomputers (see story above).

Until now, "You haven't seen a mainframe-to-micro company making such a financial commitment to Unix," claimed Dewaine Osman of Sperry's Americas Division.

Four models offered

The Series 5000 supermicros, meanwhile, will be offered in four models, reportedly supporting from eight to 64 users and offering processing at a rate ranging from .7 millions to 3.2 millions of instructions per second.

The machines, based on the Motorola, Inc. 68000 CPU, will reportedly offer dual bus design and a separate processor/memory technique that provides error checking and correction.

Series 5000 supermicros will be priced from $15,000 to $50,000 for the low-end 5000/20 and 5000/40 models and from $62,000 to $150,000 for the high-end Models 5000/60 and 5000/80. Shipments of Models 5000/20 and 5000/40, being manufactured for Sperry by NCR Corp. and two other firms, will reportedly begin at the end of January 1985, while shipments of the Models 5000/60 and 5000/80, being manufactured by Arete Systems Corp., are not scheduled to begin until March 8, 1985.

Unix System V for the Series 5000 machines will be priced from $1,250 to $22,500, depending on the number of users.

Sperry's Series 5000 announcement was accompanied by the unveiling of office automation and factory automation software packages for the line.

The integrated office automation package, Q Office, is said to offer word processing, spreadsheet capabilities, data base manipulation and graphics. It is priced from $3,500, for the 5000/20, to $20,000, for the 5000/80 64-user system.

Sperry's Manufacturing Business Solution (MBS) factory automation package runs under Unix on both the Series 5000 and on the 7000/40 supermini.

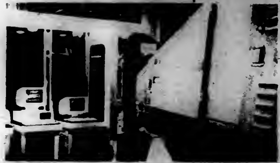
MBS is said to be an on-line MRP-II manufacturing control system with integrated financial applications, including transaction history, actual-cost to standard-cost variance reporting, year-end material and financial rollover functions and password security.

Terminals announced

Also announced at its Comdex press conference were two terminals that the firm said would be most appropriate in a Unix environment — the SVT 1210 and SVT 1220. The SVT 1210, priced at $695, reportedly provides green-screen display and Digital Equipment Corp. VT52 and VT100 terminal emulation. The SVT 1220, priced at $795, reportedly emulates the DEC VT220.

Citing one projection that estimated sales in excess of 2.5 million Unix systems by 1988, Sperry's Osman said his firm "is positioned exceptionally well to take advantage of this Unix growth potential" and that such emphasis would help the firm move away from relying on its mainframe line as its primary source of revenue.

Sperry can be reached through P.O. Box 500, Blue Bell, Pa. 19424.



Comdex/Fall '84:

Setting the stage

Photos by David L. Waite

NEWS

Managers go to Comdex for micro news

CW AT COMDEX/FALL '84

By Kathleen Sullivan
CW West Coast Bureau

LAS VEGAS — For microcomputer managers, the Comdex/Fall '84 conference, held here last week, represented the opportunity to stay a step ahead of the continuing explosion of technology and products in the personal computer industry.

"Generally, we're here because we're trying to stay a little bit ahead of the curve," said Roger G. Neaves, vice-president and general manager of data center planning for San Francisco-based Wells Fargo Bank. Neaves was one of several micro managers interviewed by *Computerworld* at the start of the show.

"We are trying to avoid getting buried," Neaves added. Neaves said he and Raymond E. Potts, who serves as his assistant in the data center planning division, planned to walk through the entire show, which this year included 1,400 exhibitors spread out among six major facilities.

"If anything catches our eye, we'll stop and look at it," Neaves said. Neaves and Potts, who oversee the purchase of computer equipment for Wells Fargo — from personal computers to mainframe systems — said Comdex gives them the chance to accomplish several tasks at once.

The two planned to check out new products at the request of their end users who had asked about software programs that had been announced. Neaves, who pointed out that some companies in the personal computer industry have had problems delivering a product after announcing it, said Comdex would give him the chance to confirm whether new products "were alive and well" or were simply "vaporware."

In addition, Neaves and Potts said they would be investigating current offerings in the local-area net market for Wells Fargo, which has installed close to 900 personal computers in its offices throughout California.

For large organizations that have made a commitment to personal computers, local-area networks represent the "obvious next step" in making the machines more productive and more useful, Neaves said.

Neaves and Potts cited other interests as well, saying they would be looking for dumb terminals to hook up to IBM's recently announced Personal Computer AT, as well as multifunction boards for the machine.

In addition, the two said, they are now wrestling with the issue of data security and would be paying attention to exhibitors who offered products in that market.

Steven Hochberg, vice-president of Complete Technology Corp., a Flint, Mich.-based firm that acts as a microcomputer consultant to Fortune 1,000 firms, said Comdex would give him the chance to stay "one step ahead of users."

While most users help micro managers decide which products will be used within an organization, the microcomputer manager must stay on top of the changing technology, new products and new buzzwords, Hochberg explained.

Hochberg, who said Complete Technology has installed approximately 60 personal computers in its own offices, said he would be looking at a variety of products at Comdex, including printers, micro-to-mainframe link packages and project management software.

Unlike Neaves and Potts, Hochberg said he would not be focusing on developments in the network market while attending Comdex. Although Hochberg said he was interested in the technology, he did not expect any significant announcements in local-area nets at this year's show.

Hochberg said most of his firm's users were satisfied with their basic applications software packages, as he would not be looking at new programs. Instead, he said, he was interested in software productivity tools, such as Topview, IBM's recently announced operating environment.

"Management is crying out for some type of system where users can get on a computer and hunt and peck their way through several software packages under their own menu system," he said.

Hochberg said he planned to take a look at Topview, which is said to provide a windowing and multitasking environment for applications software.

COMDEX from page 1

software offerings and dozens of personal computer and multiuser micro system debuts. It also placed a considerable emphasis on communications links.

Among major Comdex developments, Sperry Corp.'s Information Systems Group unveiled plans to put AT&T's Unix on a broad line of products (see story page 1). Texas Instruments, Inc.'s Pro-Lite laptop computer (see story page 57) and Lotus Development Corp.'s Jazz software for the Apple Computer, Inc. Macintosh (see story page 6), also gathered crowds.

In other software moves, Ashton-Tate introduced upgrades of its Framework, Dbase II and Dbase III application programs that are fully supported by the IBM Personal Computer AT. Updates for current licensees range from $25 to $35 (depending on shipping costs), except for licensees of Dbase II version 2.3 and earlier, who will be charged from $75 to $90. Ashton-Tate is located at 10150 W. Jefferson Blvd., Culver City, Calif. 90230.

Microsoft Corp. showed two new applications for the Macintosh, the Microsoft File data management package and the Microsoft Word word processing program. Each will be available by the year's end and will cost $195. Microsoft is headquartered at 10700 Northup Way, Bellevue, Wash. 98009.

Apple itself introduced a 10M-byte hard disk drive for its Lisa, Apple II and Apple III. The Profile system will be available this month for $1,995. Apple is located at 20525 Mariani Ave., Cupertino, Calif. 95014.

Third-party developers also showered the Macintosh with hardware and software products, including a hardware accessory kit that hooks the system to the NEC Information Systems, Inc. Spinwriter letter-quality printer. The kit costs $100 and is available from NEC at 1414 Massachusetts Ave., Boxboro, Mass. 01719.

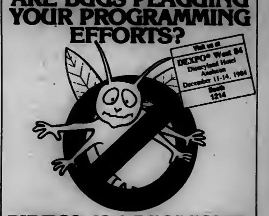
In networking, the first diskless workstation from a leading vendor of IBM Personal Computer-compatible systems appeared. The diskless version of the Zenith Data Systems Corp. Z-150 is shipping now with a $1,599 price tag, according to Zenith, which is based at 1000 Milwaukee Ave. in Glenview, Ill. 60025.

The show also featured many recent network offerings, including enhancements of 3Com Corp.'s Etherseries software. Etherseries 2.4 products reportedly support the Personal Computer AT and provide a new menu system that boosts security and enables users to custom-design application menus. 3Com also cut prices on software and hardware products from 18% to 70%. 3Com is located at 1365 Shorebird Road, Mountain View, Calif. 94039.

Many multiuser microcomputers running some version of Unix were introduced at Comdex/Fall, along with several other multiuser systems designed to connect to personal computers. In the second category, Televideo Systems, Inc. showed the PM/16T, an enhanced version of its Personal Mini/16 that adds an integral 20M-byte streaming tape drive, 512K bytes of random-access memory, a multiuser version of the vendor's Infoshare operating system and an electronic mail package. The PM/16T will be available in February for $9,995, according to Televideo, which can be reached at 550 E. Brokaw Road, San Jose, Calif. 95112.

Among the host of add-on products for the Personal Computer AT appearing at Comdex, Sysgen, Inc. displayed a 45M-byte cartridge tape backup subsystem. The Qic-File subsystem costs $1,395 for an internal version and $1,495 for an external model, according to Sysgen, which is headquartered at 47853 Warm Springs Blvd., Fremont, Calif. 94539.

Comdex also produced several 2,400 bit/sec modems targeted for personal computers. One leading contender is the Hayes Microcomputer Products, Inc. Smartmodem 2400, which is said to provide intelligent transmission controls, voice/data switching and the ability to set communications instructions with keyboard commands. The modem is available for $899 from Hayes, which is located at 5923 Peachtree Industrial Blvd., Norcross, Ga. 30092.



Coalition needed to stem computer crime

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — Only a concerned coalition of government, industry, users and consumers can stem the tidal wave of computer crime that threatens to engulf the U.S., according to the head of one of the nation's largest public data networks.

J. David Hann, president of GTE Telenet Communications Corp. told visitors at last week's 11th Annual Computer Security Conference here that the responsibility for halting the growing danger of computer crime and computer security violations is a shared one.

Hann said the task of stopping the computer crime wave must be taken up not only by legislators and industry officials, but also by all computer users and "every consumer whose tax and credit records — even medical records — are kept in computers.

"Over the past year and a half," Hann said, "we have seen a lot of media hype and stridency on the part of public lawmakers concerning computer security. But this already enormous problem is still growing. What can we do to stem the computer crime wave?" he asked.

"I believe the problem is solvable," he continued. "I am very optimistic about our future progress in stopping computer crime. A solution is within reach — a solution based on a new level of commitment and cooperation that is growing today. Industry must band together with users and government to find an effective and just solution to the problem of computer crime."

Hann said the current generation of computer criminals — so-called hackers — has been portrayed as bright, adventurous "kids" who utilize public networks to illegally access unguarded systems. But he warned of a far more serious security issue, the rise of a sinister class of criminals who use computers to perpetrate their crimes.

According to Hann's statistics, an armed robbery, on the average, nets the criminal $3,000, and the average embezzlement yields between $19,000 and $25,000. But the average computer crime earns the perpetrator a staggering $100,000 to $500,000, he said.

Hann quoted a June 1984 report released by the American Bar Association's Task Force on Computer Crime [CW, June 18], which showed that fully one quarter of the nation's largest corporations reported verifiable losses due to computer crime. The total value of those losses was reported to be between $145 million and $730 million, which represents an average loss of $2 million to $10 million per respondee.

Billions of dollars lost annually

"If we take this as a representative sampling of other businesses and government," Hann said, "computer theft and abuse costs North American businesses billions of dollars annually."

And, according to Hann, the hackers who pester public networks add to that costly toll — even if they do nothing more than illegally access computer systems. "An alert, determined operations staff is needed to find the very small clues left behind by professional criminals. But the crowds of hackers provide a steady distraction." The youthful hackers prove to be such a distraction, Hann said, that the attention of the operations staff is diverted from tracking down the professional criminals. "So the whiz kids are contributing to the proliferation of serious crime and abuse. Computer trespassing is not child's play even if no harm is done," he said.

GTE Telenet's own Telenet communications network was used by hackers in August 1983 to break into computers in the Nuclear Research Facility at the National Laboratory in Los Alamos, N.M. [CW, Aug. 22, 1983].

What is Hann's system for ensuring computer security in a public data network environment? First, consumers, computer owners, public network operators and government officials must work together to promote legislation that matches penalties to the seriousness of the crimes. In addition, industry officials must take a firm stand on pressing charges against suspected offenders.

As a third step, Hann said public network operators should begin to educate customers on potential security risks and on methods for improving the integrity of their systems. Finally, those operators must enhance the security of the networks by providing security products and services to their customers.

Computer crime bill inadequate

What has GTE Telenet done along those lines? "We have pressed for strong legislation, and we have worked with the [House of Representatives] to draft such a law," Hann said. "The bill that was finally passed this year [CW, Oct. 15], is not adequate to cover the full problem, and it should be reviewed and strengthened in the next legislative session," he added.

Hann said GTE Telenet had also contacted the governors of all 50 states to promote stronger state legislation and has practiced a policy of cooperating with law enforcement officials to prosecute violators. He said the firm has been successful to date in obtaining both indictments and guilty pleas under federal wire fraud statutes.

In addition, he said, GTE Telenet has worked to provide customers with new security products and services, such as public key encryption methods for electronic mail and personal identification number systems to prevent unauthorized access.

Equitable workers win VDT safety clause in contract

SYRACUSE, N.Y. — Clerical workers at a major insurance company here agreed to a labor contract earlier this month that included groundbreaking provisions involving VDT health and safety.

A spokeswoman for District 925 of the Service Employees International Union of the AFL-CIO, said the agreement with the Equitable Life Assurance Society of the U.S. could serve as a future model for protecting employees who work with VDTs.

"What's important here is the breadth of concerns covered in the contract," said Karen Nussbaum, president of District 925 and head of 9-to-5, the National Association of Working Women.

The agreement covers 54 members of District 925 — insurance claims processors and support personnel — who work at Equitable's group benefits office here. Nussbaum said the contract is especially significant in that it involves a private company in an industry that has been difficult to unionize.

Provisions of agreement

The accord includes provisions for installation of glare reduction devices, adjustable chairs, detachable keyboards and regular machine maintenance.

The contract provides for extra work breaks away from VDTs, and it also gives female workers the right to ask for transfers to non-VDT work during pregnancy.

Gilbert M. Reich, an Equitable vice-president, said the company "is pleased that the terms of the agreement fall within the framework of our long-term business plans."

Workers and unions have long been seeking protections related to health and safety issues involving VDT use. Various scientific studies have provided inconclusive and sometimes contradictory evidence about the hazards posed by VDTs.

Threats to systems outpacing security technology

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — While they give security products vendors an "A" for effort, most visitors to last week's 11th Annual Computer Security Conference here said they don't think security technology is keeping pace with the threats to computer systems.

In a random survey conducted on the exhibition floor attendees told *Computerworld* that they were encouraged by the awakening of interest and the growing level of research and development demonstrated by vendors. Security personnel interviewed expressed considerable interest in the increasingly sophisticated access-control and data encryption devices and microcomputer security products only now becoming available.

But those same executives lamented the lack of a comprehensive approach to security — one product or vendor that handles all aspects of a company's security requirements — and the narrowly focused, task-specific nature of many of the products demonstrated here.

"It is very clear that the technology is not keeping pace. We haven't even quantified the threats yet. The risk possibilities have not been explored fully," David Moore said. Moore is second vice-president of Jefferson-Pilot Information Services, Inc., located in Greensboro, N.C.

Risks in data communications

According to Moore, the real security issues do not involve in-house, hard-wired systems, but the increasing risks involved in data communications. "Outside communications concerns me," he said. "We have a responsibility to our customers to protect their information. Some of the products here are years ahead of any need we might have, but none solves all our problems."

Alfred Foster, data security administrator with Englewood, Colo.-based U.S. West, also applauded vendor efforts. "They are making a very good attempt to meet our needs. The increase in R&D in security in the past year is phenomenal. Suddenly, everyone is interested in security it seems."

Foster said the greatest worry he faces with U.S. West, one of the holding companies created by the breakup of the Bell system, is authorized users remotely accessing corporate information. "Once that data is outside the mainframe," he said, "you have lost all control over it. There is really nothing you can do except try to maintain accurate audit trails. As far as I know, there are no products available today that address that concern."

With between 400 and 600 mainframe terminals under his security control, John Schneider complained about the limited scope of the security products available. "The kind of security I am looking for transcends the equipment I have seen here," said Schneider, who is security control administrator for ITT Communication and Information Services, Inc. in Secaucus, N.J. "Some of these systems require you to have one access control box per terminal. I do not need something like that. I want one box that can handle all our terminals. Otherwise, it just is not cost-effective."

Philip Smitkey, assistant vice-president of the Cedar Rapids, Iowa-based Banks of Iowa Computer Services, said he would like to see advances in text encryption technology.

"The variety of products today is incredible compared [with] just a couple of years ago," he said. "I am responsible for security within my organization. We have physical security devices and access controls in place, but we need more in the way of encryption. The way that communications is growing, including the use of satellites, that is vital."

Though he believes the technology is just now starting to catch up with the threats to computer systems, Michael McNamee said that something more than products is needed to ensure the integrity of information. "Users must be made aware of the threats to security," he said. "The information they are using and distributing is valuable, and they just do not realize the importance of integrity."

"I would like to see better education on security in our colleges," said McNamee, who is information asset security administrator with IBM in Westchester, N.Y. "I would like to see a curriculum for data security professionals. My background is in finance, and I only got into this field in my role as an auditor."

But in the end, according to Robyn Strang, the race between technology and threats may prove to be a vicious cycle. Strang is security officer with Menlo Park, Calif.-based Saga Corp. "I think we are making some advances, but someone will always counter them. Some of the products seem incredibly advanced, but it is only a matter of time before someone catches up to them. No matter what controls you develop, someone will always find a vulnerability."

Safeguarding security plan integral to overall strategy

CW AT COMPUTER SECURITY CONFERENCE

By John Gallant
CW Staff

ROSEMONT, Ill. — There are many different kinds of security. There is the security of being surrounded by loving family and friends. There is the security that comes from knowing you have enough life insurance. There is also data and computer systems security.

And then there is the security of security.

Redundant? Donn Parker doesn't think so. Important? Probably more than you can imagine, according to Parker.

Parker is a senior management systems consultant with Menlo Park, Calif.-based SRI International, Inc. and an expert in computer systems security. The author of three books on computer crime, Parker is also currently directing a computer abuse research project funded by the National Science Foundation.

Last week, at the 11th Annual Computer Security Conference here, he related to attendees the vital importance of protecting and safeguarding information about their security systems and practices. "An organization's security information about controls, practices, vulnerabilities and plans is the most sensitive of all," Parker said, "because it is the key to unlocking all other information. Secure security practices are needed. I may sound a bit paranoid, but you would do well to listen."

According to Parker, the security of security is plagued by two major classes of problems. The so-called active problems involve the voluntary, though perhaps not intentional, disclosure of secrets. The active problems include casual meetings and conversations in which a security administrator may unwittingly reveal his firm's security secrets — what Parker labeled a "loose lips sink ships" situation.

In addition, third-party questionnaires and inquiries as well as vendor and outsider visits pose the potential for active disclosure. And, while they are touted as one approach to designing company-wide security systems, in-house task forces often present another threat of overly wide security data dissemination. Parker also listed among the active problems in-house publications, training programs and overly informative terminal prompts to users who have not even logged on.

"I am amazed at the amount of information you will tell a total stranger at a conference like this," Parker said. "You will willingly reveal your security mechanisms, your safeguards — even your weaknesses. You are giving away the keys to the kingdom."

The second class of problems is what Parker labeled passive ones, involving involuntary disclosure of systems and practices. Among these are theft of security information, industrial espionage, the loss of such data and "spoofing," in which an unauthorized person poses as a legitimate insider to gain knowledge.

Parker outlined a number of steps an organization can take to offset both the active and passive threats to the security of security.

- First, a company must establish strict security policies and provide notice of them to every employee.
- A company must also promulgate a code of security conduct that establishes rewards for compliance and penalties for violations, such as disclosing a password.
- Firms should obtain confidentiality agreements with all vendors and consultants and provide for safe practices for the hiring and firing of all personnel, especially security employees.
- Parker urged corporations to avoid detailed disclosures of security data and to minimize screen prompts to prospective system users.
- Finally, he warned security personnel to keep losses secret.

Parker urged the careful control and discarding of security documents and the undertaking of an in-depth inventory of such information. In addition, he warned security administrators and all other executives to travel safely, carefully securing company information in their personal possession.

"Assume the enemy knows what you are doing, but keep everything as secret as possible. Employ the military's need-to-know concept for all security information. With everything you say, consider that your listener may be your worst enemy. The job you save may be your own," Parker said.

FBI head urges preventive action to protect sensitive data

By John Gallant
CW Staff

ROSEMONT, Ill. — In rapidly evolving industries such as the computer field, both law enforcement agencies and the private sector must work to keep abreast of potential problems, or the "twisted mind" will get ahead, the director of the Federal Bureau of Investigation said last week.

Speaking at the 11th Annual Computer Security Conference here, Judge William H. Webster assessed the "big three" problems — technology transfer, industrial espionage and computer-related crime — that he said threaten both corporate and national security today. Webster also outlined the steps the FBI has taken internally to beef up the security of its own computer systems.

Webster said the responsibility for countering the transfer of vital military and industrial technology rests squarely with his agency, assisted by the departments of State and Commerce and the U.S. Customs Service. He said that since the 1930s the Soviet Union has spent vast sums of money and manpower in an attempt to acquire such technology.

Webster said that in the past year there has been a spate of cases involving classified documents and other data being turned over to foreign intelligence officers and agents. Those cases have involved all types of people, Webster said, even an FBI agent arrested for allegedly supplying secrets to two Soviet agents.

"Our goal in foreign counterintelligence work is to identify and neutralize foreign intelligence operations, not just to arrest and prosecute the individuals involved," Webster said.

After touching only briefly on industrial espionage, Webster said that the investigation of computer-related crime has become an important facet of the agency's white-collar crime program.

He said that the FBI has begun to track crimes that fit the agency's definition of computer-related crime. He estimated the average dollar loss as around $500,000 per incident. Webster said it does not require genius to perpetrate a computer crime, only know-how.

"Since the investigation of computer-related crime is relatively new," Webster said, "we have had to develop new training methods. Since 1976 we have trained more than 300 agents and other law enforcement officials through our Computer-Related Crime school. It provides the basic skills needed to unravel the tangled trail of computer crime."

Webster said the agency had improved its own internal computer security by eliminating dependence on leased communications lines through the use of only dedicated lines, relying on transmission of only encrypted data, using access control devices and security software, employing the technique of periodic password changes and following strict policies for the acquisition and training of employees.

Webster characterized the federal computer crime legislation passed this year [CW, Oct. 15] as a beginning and said it would bring a measure of consistency to the state legislation in place or under consideration.

Computer leasing expands, lessors optimistic

Financing, mart niches viewed as key factors in current leasing boom

INDUSTRY SPOTLIGHT

By Peter Bartolik
CW Staff

Coming out of the national recession two years ago, the computer leasing industry was troubled with uncertainty over the impact of IBM's leap into the third-party computer financing industry. Today business is booming, seemingly for everybody, and the industry is attracting new players; but nobody in the business is breathing any easier.

"There has always been a pall over the third-party leasing business, especially in the computer area," said Kenneth Pontikes, chairman of Comdisco, Inc., in an interview earlier this year. The industry, according to Jon J. Prager, chairman of Finalco Group, Inc. "has been through its ups and downs."

The industry right now is undoubtedly going through an up cycle. Market research firm International Data Corp. of Framingham, Mass., recently projected that the computer-related leasing industry as a whole will grow to revenues of $7.6 billion this year, a 30% increase over 1983 — about double the growth rate of the computer industry in general — and will grow 30% each year through 1987. IDC's figures include the market for used computer equipment, an area intertwined with leasing.

During the October meeting of the Computer Dealers and Lessors Association (CDLA), which numbers more than 200 companies as members, outgoing CDLA President Richard A. Forsythe, head of Chicago-based Forsythe/McArthur Associates, Inc., noted that "40% of the attendees [at the meeting] were not members two years ago. There is a lot of growth in this area."

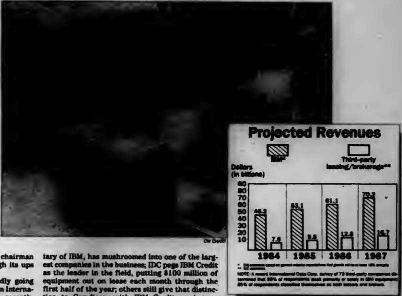
In a recent IDC survey of 73 third-party leasing companies, 91% of the respondents rated business this year as good or excellent, and 94% said next year will be good or excellent. Despite that optimism, 62% of the respondents said they need to be more creative in order to stay competitive, and 41% said they need to diversify.

One does not have to look far to understand why today's optimism is tinged with caution about the future. IBM Credit Corp., the leasing subsidiary of IBM, has mushroomed into one of the largest companies in the business; IDC pegs IBM Credit as the leader in the field, putting $100 million of equipment out on lease each month through the first half of the year; others still give that distinction to Comdisco, with IBM Credit coming on strong in second place.

Formed in mid-1981, IBM Credit is now in high gear, estimated by IDC to be increasing its lease values by 92% this year and 50% next year.

The impact of IBM Credit on the third-party industry is a subject of debate within the industry. Some, like Comdisco's Pontikes, assert that IBM has legitimized an industry that has suffered from more than its fair share of scandals and IBM has thereby increased the size of the potential market; others, like Finalco's Prager, say IBM Credit has substantially limited growth opportunities in the IBM CPU and peripherals market (see story page 22). Even less clear is the impact that IBM Credit will have on the used computer market. The used market and the leasing market are inextricably tied together and, at some point, the equipment IBM Credit has put out on lease will begin to enter the used equipment market (see story page 23). Although there are many used equipment dealers not involved in leases, companies involved in leases are always involved in used equipment.

IBM is not the only computer manufacturer with a captive credit corporation; most of the large vendors have such subsidiaries or allied ventures formed with existing financing companies. The latest to jump into the fray is AT&T Credit Corp., which hopes to do for telecommunications equipment what the third-party market did for computer equipment. According to Charles Greco, director of financial services at IDC, "AT&T is trying to do in one year what it took IBM 20 years to do."



NOTE: A recent International Data Corp. survey of 73 third-party companies determined that 90% of respondents dealt primarily or solely in IBM equipment; 85% of respondents classified themselves as both lessors and brokers.

CW CHART

The leasing of telecommunications equipment, spurred by the deregulation of AT&T's equipment resources, is seen by many in the leasing industry as a potentially explosive new market. Edward Cherney, president of CMI Corp., is working with AT&T to develop distribution channels for used AT&T equipment, and he said that the key to success in that area lies in AT&T's commitment to make used telecommunications equipment a commodity in the same manner that IBM equipment has evolved. Cherney said AT&T has made that commitment through a willingness to provide maintenance of used equipment. AT&T Credit, while focusing initially on telecommunications gear, has made it clear it also intends to function in the computer market.

Finalco's Prager noted that "competition has been a way of life for us," and he expects to see IBM's and AT&T's credit subsidiaries, along with

See EXPANDS page 18

IBM Credit Corp. ascends to top of leasing firm arena

By Peter Bartolik
CW Staff

INDUSTRY SPOTLIGHT

In recent years IBM has taken aggressive steps to eliminate rental and leasing of its equipment. Realizing that many customers still do not want to purchase equipment, however, IBM established a subsidiary to provide that rental option while still recording the equipment on its own books as an outright sale.

From its start three years ago as a five-man operation, IBM Credit Corp. has grown to replace Comdisco, Inc. as the premier leasing company in terms of volume, according to Charles Greco, manager of financial services with market research firm International Data Corp. (IDC) of Framingham, Mass.

IDC estimates that IBM Credit was writing leases in the first half of this year at the rate of $100 million worth each month, and because the second half of the year is traditionally busiest, IBM is estimated to achieve $1.7 billion by the end of the year. "IBM Credit Corp. will win any deal it wants to win," Greco declared.

James Benton, executive director of the Computer Dealers and Lessors Association (CDLA), an industry group composed of more than 220 third-party companies, conceded that IBM Credit Corp. will likely displace Comdisco as the No. 1 lessor by the end of the year, but argued that IBM does not want all of the third-party business. Third-party companies collectively have historically been IBM's biggest customer.

"The reason for IBM Credit's existence is that IBM wanted to get out of the leasing business and needed cash flow. But IBM was not going to give all of that business to the third-party companies," Benton said. With some 2,000 salesmen employed by CDLA members primarily in the business of leasing IBM equipment, he added, "We're an integral part of [IBM's] marketing strategy."

Kenneth N. Pontikes, chairman, president and founder of Comdisco, went as far as to question IBM Credit's viability in the area of financing leases. "If you look at IBM Credit in competition with the third-party industry, can they make the kinds of returns in that business that the rest of their businesses have the opportunity of making? No, they can't," he declared, predicting that IBM Credit will shift away from the financing of leases.

Pontikes and Benton both argued that the third-party industry is growing at twice the annual rate of growth of DP equipment sales; the third-party market is expected to grow as much as 34% this year to between $7 billion and $8 billion. "It's almost as if there is a realization that these [third-party] services are required as well as the additional hardware and the financing. I think that bodes very well for the industry as a whole," Pontikes said.

Jon J. Prager, chairman and chief executive officer of Finalco Group, Inc., readily conceded that the impact of IBM Credit's growth has "substantially limited growth for companies like Finalco over the next couple of years."

But Prager noted that competition has always been fierce in the leasing area and his company has prevailed "while big institutions have come and gone."

Greco believes IBM's subsidiary will attempt to duplicate the growth patterns of the other segments of its parent's business, and he argued that third-party companies must become more flexible in structuring their leases and will have to diversify into other areas such as communications equipment and software leasing.

Indeed, the larger companies appear to be making efforts to enter other market areas. Comdisco is marketing a disaster recovery service and has established a risk arbitrage subsidiary, among others; Finalco, which used to lease only DP equipment, in fiscal year 1984 wrote 53% of its leasing volume in non-DP equipment, including aircraft, telecommunications equipment, computer-aided design and manufacturing equipment and other types.

The leasing companies are also shying away from a dependence on leasing CPUs, a reliance that caused the collapse of Itel Corp., and are instead devoting more resources to peripheral equipment, which has a longer life span and greater residual values. Finalco, for instance, reported that in the fiscal year ended in July, mainframe leases represented only 5% of its total leasing volume.

EXPANDS from page 17

those of other vendors and financial institutions, competing in many areas with the independent companies.

The growth in the leasing industry is so great and expected to continue over a long term, that one of the greatest concerns facing the industry, according to Forsythe, is "how to finance that growth." He said the industry could grow to $20 billion by 1990, based on current projections, and outside financing is a key to growth of third-party companies that cannot afford to tie up their assets in leases.

The fastest growing source of outside financing has also been the most controversial. There are many types of leases and many labels, but one type that has generated great profits and great problems is that known as tax-advantaged. A simplified explanation of this lease is that the leasing company, in exchange for various tax benefits and a portion of resale values, obtains the financing for equipment from outside investors, and the leasing company administers the lease for those investors.

A key to this type of lease is the tax shelter it provides to the investors, who see practically no profits from the actual lease until after the lease expires and the equipment is resold. It serves to provide users with relatively low-cost equipment; leasing companies can avoid tying up their own cash in leases; and investors gain short-term tax write-offs and long-term profits. Everybody is happy except for the IRS, which is currently on a crusade to halt all tax shelters that it deems are created merely for the purpose of sheltering income.

James F. Benton, executive director of the CDLA, concedes that the IRS does not appear to be singling out the computer leasing industry, but in fact is going after many industries involved in shelters. Nevertheless, he added, the scrutiny of what he calls "essentially plain vanilla wrap leases," along with a negative business journal article last year critiquing Comdisco's financial practices, has served to deter a number of leasing companies from going public.

According to IDC's Greco, the key for the future of the third-party industry, buffeted on one side by IBM and on the other by ever-changing tax laws, lies in its ability to remain flexible and to diversify. "Third-party companies have to continue to look for creativity; they must become more flexible in structuring their leases in order to compete with IBM Credit," he said. The independent companies must also quickly move into new areas where IBM and others have yet to focus, he added.

For smaller companies, the key to long-term growth may not be new markets, but rather identifying existing markets niches that are overlooked or neglected by IBM Credit and the bigger independent firms.

According to Robert Miller, chief executive officer of Minneapolis-based Centron DPL, "nichemanship" is the key to success. Relatively small, with revenues last year of $16.6 million, Centron DPL has focused primarily on leasing IBM front-end controllers, products that have a long product life compared to CPUs.

Robert Irish, vice-president of technical sales with Centron DPL, put the company's relationship with IBM in perspective: "Sometimes you're the good guy and sometimes you're the bad guy; and sometimes you're tolerated."

IDMS/R is proving to be what most people expected it to be:

Simply the best.

For nearly a decade, in survey after survey of the data processing community, one database management system was consistently rated first in user satisfaction—IDMS.

So when we announced IDMS/R in April of 1983, expectations naturally were high for a versatile database management system that would combine the ease-of-use of a relational architecture with high performance.

That was the promise we made. And that, in fact, is the product we've delivered.

With IDMS/R, people whose only data processing experience is an encouraging "you can do it" from the dp department are finding themselves able to create their own customized applications. They're doing it quickly, easily and, best of all, *independently.* And that comes as a welcome relief for overburdened dp personnel.

As for complex, high-volume production applications, IDMS/R is without peer. With an exclusive Cullinet feature called "Relational Fastpath," data processing can tune the database and thereby benefit from a dramatic boost in performance. Moreover, IDMS/R has the most sophisticated back-up and recovery capability of any dbms—an absolute must for on-line applications.

And when one considers that IDMS/R is the cornerstone of the only information management system available today that fully integrates database, applications and decision support software, choosing a relational dbms becomes a very simple decision.

To attend a Cullinet Seminar, phone, toll-free, 1-800-225-9930. In MA, 617-329-7700.

The Complete Software Solution

Cullinet

We understand business better than any software company in business.

Oddly enough, most offices are better equipped for the future than the people who will create it.

The MIT Museum

According to recent reports, this last year, businesses spent over $10.5 billion successfully automating America's offices.

Meanwhile, do you realize what many of the scientists and engineers are using to design and develop America's new products?

Hand calculators.

Which is just preposterous.

Especially now that there's computer-aided analysis software designed specifically to do what all technical professionals spend most of their time doing: analyzing data.

The evolution of scientific tools.

It's called RS/1.™ And it's from BBN Software Products Corporation.

RS/1 is fully capable of making technical professionals 4-5 times more productive. Which in turn, will allow them to create considerably better, considerably more reliable new products. In a fraction of the time it now takes.

And it will do so without turning them into hackers. RS/1 works like a research assistant. Not a computer.

Lest you doubt the significance of RS/1, we would hasten to point out that a single copy of RS/1 running on a single computer has already saved one company over $7 million. In one plant. In one year. Without any additional investment in new equipment. They did it simply by allowing their technical professionals to explore alternatives they never had the time to before.

And if you think RS/1 may be something you should look into in the future, you should know that many leaders in American industry are already using it to get their new products out into the marketplace faster.

Don't expect them to tell you about it, though. They'd just as soon you continue spending your money only on getting your letters out faster.

For information on RS/1, call toll-free 1-800-251-1717.

This one's for the VAX and PDP-11.

This one's for the PRO 350/380.

BBN Software Products Corporation

One Alewife Place, Cambridge, MA 02140
A Subsidiary of Bolt Beranek and Newman Inc. bbn

PRO 350/380, VAX and PDP-11 are trademarks of Digital Equipment Corporation.
RS/1 is a trademark of Bolt Beranek and Newman Inc.

Second-hand computers make more for lessors

By Peter Bartolik
CW Staff

Not all used computer dealers deal with leases, but all computer lessors deal in some manner with used computers.

The leasing of new equipment and used equipment is inextricably tied to the selling of used equipment. That is so because leases are structured around the expected resale or residual value of equipment when those leases expire.

In all leases other than those structured outright to provide ownership of equipment to a lessee upon termination of the lease, the residual value is probably the key component.

When a leasing company provides a user with a piece of equipment for a three-year period for lease payments that will add up to, say, 60% of the purchase price paid by the leasing company, it does so based on the assumption that it will be able to recover the balance plus a profit from the sale of the used equipment after the lease has terminated.

According to the manager of financial services for Framingham, Mass.-based International Data Corp., Charles Greco, who is involved in determining residual values of IBM equipment, the golden rule in determining those values is: "Be accurate or be conservative." According to Greco, when a leasing company writes a lease based on residual values, accuracy will ensure a profit, conservatism will bring greater profit and inaccuracy on the side of overestimating residual values leads to disaster. The most famous case in point, according to Greco, was the bankruptcy of Itel Corp., which saw its overvalued inventory of IBM 370 mainframes devalued overnight with the introduction of the IBM 4300 line.

IDC said it bases its determination of residual values on a model developed through the analysis of historic information. IDC has identified four major life cycle phases through which all computer equipment passes, albeit at various rates of speed:

- The active marketing life starting from first delivery of prod-

See RESIDUAL page 23

INDUSTRY SPOTLIGHT

LESSOR from page 17

ever greater amounts of equipment, they, like the users, do not want to tie up their assets in equipment inventory. In essence, the lessor, with purchased equipment on his hands, looks around for somebody else to buy the equipment, providing the lessor with additional cash to make more deals.

Historically, the traditional vehicle for the lessor has been the nonrecourse or leveraged lease. In this scenario, the lessor, after arranging a lease, puts up 20% or more of the purchase price and obtains the balance from a financial institution in exchange for assigning lease payments to that institution. The lessor makes a commission from assignment of the lease and retains the tax benefits of ownership. The financial institution provides the money based on the collateral value of the equipment and in the event of nonpayment can repossess the equipment, but it has no recourse to seek repayment from the leasing companies.

The newest wrinkle to leasing, and the most profitable and controversial, is the tax-advantage lease, or wrap lease. In this scenario, the lessor merely arranges a lease for a user; the equipment is then sold for a small portion of its actual value to one or more third-party investors who actually lease the equipment back to the user and arrange for the leasing company to administer the lease. Lease payments generally are assigned by the investors to the leasing company for the first few years of the lease. The investors gain tax shelters in that their investments are generating little or no return in those first few years, and various tax credits can be divided a number of ways.

While extremely profitable for leasing companies, the tax-advantaged lease is under constant scrutiny from the Internal Revenue Service, which terms as abusive — and therefore nondeductible — any shelter that provides an investor with no benefit other than the sheltering of income. Both Comdisco, Inc. and Finalco Group, Inc. suffered financial setbacks when it was revealed that the IRS was investigating their use of such lease instruments; investors were scared off by the possibility that the IRS would turn around and disallow the tax deductions at the heart of the lease. Both were effectively given clean bills of health when those investigations were terminated.

However, according to Jon Prager, chairman and chief executive officer of Finalco, the IRS, both before and since the investigation, has assigned an agent to monitor the company's tax-advantage activities. Prager said such scrutiny "is a way of life."

IBM Credit in the resale arena: Estimating its impact

INDUSTRY SPOTLIGHT

By Peter Bartolik
CW Staff

The biggest question facing participants in the third-party market — including lessors and also dealers of used equipment — is the impact that IBM Credit Corp. will have on the resale market.

IBM Credit is writing leases at a phenomenal rate for a three-year-old company. Beginning with a trickle this year, and exploding in following years, IBM Credit leases will begin to expire, and the equipment currently out on lease will become available for resale and on a lesser scale for re-lease.

The Computer Dealers and Lessors Association (CDLA), a trade association representing more than 200 companies in the industry, recently pondered the question of dealing with IBM Credit in the used market. At its fall meeting in New York last month, the CDLA voted in principle to allow IBM Credit to tap into the CDLA's electronic trading network.

A minority of attendees at the CDLA meeting were in favor of banning IBM Credit participation in the network, arguing, according to those present at the closed meeting, that IBM Credit would contribute little equipment for resale by CDLA members and would instead use the access to gain strategic information about its competitors.

The majority view, however, was expressed by Edward Cherney, president of CMI Corp. of Minnesota, who said, "Either we play ball with [IBM Credit] or they will go and play in their own ballfield." Thomas Martin of New Jersey-based Computer Financial, Inc., added that third-party companies have the choice of working with IBM Credit or watching Big Blue's subsidiary develop an alternate distribution channel for used equipment that will freeze out the independent companies.

Charles Greco, a leasing specialist with Framingham, Mass.-based International Data Corp., takes the view that "IBM Credit is in for a big surprise" when it attempts to remarket used equipment. Greco said IBM Credit will be competing in the used market with established firms, such as Comdisco, Inc., that have been successful for 15 to 20 years and that have established distribution channels. "IBM has never marketed used equipment for anything less than list price to users who didn't know any better," Greco said.

But, Greco acknowledged, should IBM Credit attain success in keeping with its dominant parent, "used prices will collapse." If IBM Credit is able to flood the market with used equipment, supply will drive down prices, and residual values will prove to have been inflated for third-party companies and IBM Credit itself.

Even if IBM Credit were to establish ties with the Comdiscos of the third-party market, Greco said, those independent companies will still push their own equipment first, based on fiduciary responsibility to their own third-party investors and on plain business sense.

RESIDUAL from page 22

uct and ending just prior to announcement of a replacement model.

- Critical replacement period when shipments are at a peak just prior to replacement model announcement and when residuals may experience the first sharp decline.
- Late life, when shipments of the replacement model are declining and a new model is expected.
- Residual life, the final stage when the system has twice been superceded and residuals are low.

Key factors affecting residual values during those cycles, IDC said, are availability of replacement systems, IBM price actions and policies, major price actions that may be paving the way for new product announcements and processor capabilities.

In the past, Greco asserted, appraisers of computer equipment residuals were often way off in their estimates, with equipment devaluing at a more rapid rate than anticipated. The problems have generally been with determining residual values of CPU equipment, which have suffered from rapid introductions of replacement products, he said. On the other hand, Greco said, most appraisers generally have underestimated the residual value of peripheral equipment, which generally has a long life span.

Preventive measures essential to data security

CW AT DATA TRAINING

By Maura McEnaney
CW Staff

PHILADELPHIA — Sensitizing employees to the importance of data security is essential to preventing computer crime, data education personnel were told recently.

August Bequai, a Washington, D.C.-based attorney specializing in white-collar crime, told attendees of Warren/Weingarten Publications' Data Training Conference & Exposition at the Adam's Mark Hotel here recently that unless companies educate employees about the importance of security, they may be a likely target for abuse.

"You've got to sensitize your people to the fact that you do have a [security] problem," he said. "Teach them the value of security."

Companies should establish a computer security program that suits their needs, but, the attorney warned, "Don't go overboard — [the computer] is not a safe."

Computer crime is in its "formative years" Bequai said. However, there are several steps that managers can take and signals they can look for to help ward off computer crime, the attorney said. Among them, companies should take note of employee unrest in order to tighten up DP security. Employees unhappy about a particular company could turn to the computer for revenge, the lawyer said.

Companies should also make sure that DP equipment is properly controlled and that only authorized persons have access to the system. Firms cognizant of employee alcohol, gambling or drug problems should also be particularly careful of their computer systems, especially if abuse of the system could result in a funds transfer.

But even with this type of protection, "I bet there isn't a company here today that isn't a victim of white-collar crime," he said, adding that many of those companies have probably not detected those crimes.

Many of the companies that have been victimized by computer crime are often hesitant to bring the case to prosecution for fear of possible ridicule, higher insurance rates or alienating creditors, Bequai said.

In addition, law enforcement officials are hesitant to take on cases of computer and white-collar crime.

For law enforcement officials, the cost of following up on a white-collar crime case is almost prohibitive. "The [district attorney's] office has a $2 million budget and to prosecute a white-collar crime; you can easily expend about a half a million dollars," he said. There are also no federal and only a handful of state statutes that deal with computer crime.

One of the problems associated with computer crime is that "it is difficult to distinguish crime from non-crime," especially in the case of hackers.

OAC '85 scheduled

ATLANTA — The 1985 Office Aotomation Conference (OAC '85) will be held Feb. 4-6 at the Georgia World Congress Center here.

Sponsored by the American Federation of Information Processing Societies, Inc. (Afips), OAC '85 will offer more than 45 sessions on topics such as organizational impacts, office workstations, ergonomics of the workplace, communications, technologies and issues and productivity.

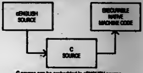
The registration fee is $125 in advance, $150 on-site. The one-day registration fee is $50.

More information is available from Afips, 1899 Preston White Drive, Reston, Va. 22091.

cENGLISH™
The C Generation Language.

What is cENGLISH? cENGLISH is a comprehensive fourth generation procedural language based on dBASE II™ syntax. It is portable to a wide range of micros and minis. The language features user-transparent interfaces to a wide range of popular C compilers, operating systems, and data base managers.

How is portability achieved? cENGLISH through its compiler interface translates cENGLISH into documented C source and uses a host C compiler to produce native machine code.



C source can be embedded in cENGLISH source.

Differences in the operating system and data base manager are handled by the runtime libraries.

The result is that cENGLISH source can be compiled without modification on any micro or mini configuration supporting cENGLISH.

What about performance? cENGLISH executes FAST, just like any compiled C program.

How easy is cENGLISH to use? While cENGLISH is a powerful high level language that can accommodate complex software development, it remains simple and straightforward to use.

Call or write for availability of cENGLISH for the following configurations—

Compilers:
  Standard O/S compilers: Lattice C™ for MS/DOS™
Operating Systems:
  UNIX,™ UNIX-like, MS/DOS,™ Coherent,™ VMS™
Data Base Managers:
  C-ISAM™ and INFORMIX,™ UNIFY,™ ORACLE,™ PHACT,™ Logix™
Foreign Language Versions:
  German, French, Spanish

Attention MS/DOS users. Demo version and special introductory offer available for IBM PC,™ XT,™ AT,™ and other MS/DOS systems. Requirements: 256K, hard disk or two floppy disk drives, and MS/DOS 2.1 or higher.

Attention dBASE II and dBASE III users. dBASE II to cENGLISH Converter now available; dBASE III Converter available later this quarter. Converted code is portable to micros or minis and executes as fast as original cENGLISH source.

dBASE II and dBASE III are trademarks of Ashton-Tate. Lattice is a trademark of Lattice, Inc. UNIX is a trademark of Bell Laboratories. MS/DOS is a trademark of Microsoft, Inc. Coherent is a trademark of Mark Williams Company. VMS is a trademark of Digital Equipment Corporation. C-ISAM and INFORMIX are trademarks of Relational Database Systems, Inc. Oracle is a trademark of Oracle Inc. PHACT is a trademark of Phact Associates. Logix is a trademark of Logical Software, Inc. IBM PC XT and AT are trademarks of International Business Machines Corporation. UNIFY is a trademark of Unify Corp.

SAMPLE cENGLISH PROGRAM

```
IDENTIFICATIONS
  MODULE:   Mininame
  AUTHOR:   bcs
  DATE:     8/29/84
  REMARKS:  Sample cENGLISH program that adds first
            names to a file
END IDENTIFICATIONS

GLOBALS
  FIXED LENGTH 1 ans
  FIXED LENGTH 15 Fname
END GLOBALS

MAIN PROGRAM
  BEGIN
    CLEAR SCREEN
    SET ECHO OFF

    USE "NAMES"
    VIEW BY "ID...FNAME" ASCENDING

    AT 23,1 SAY "Add a record? Y or N"
    AT 23,25 ENTER ans USING "!"

    WHILE ans EQ "Y"
      CLEAR GETS
      AT 6,1 SAY "Enter first name"
      AT 6,20 GET Fname
      READ SCREEN

      INSERT
        fname = Fname
      END INSERT

      AT 12,10 SAY "Welcome to cENGLISH," & Fname
      WAIT
      AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
      STORE "               " TO Fname
      STORE " " TO ans
      AT 23,1 SAY "Add another record? Y or N"
      AT 23,30 ENTER ans USING "!"
      CLEAR ROW 1 THRU 23

    END WHILE

    AT 12,10 SAY "That's all for now!"
    UNUSE "NAMES"
    SET ECHO ON

END PROGRAM
```

I'd like to know more about cENGLISH. Please send further information.

Your Name ____________ Title ____________
Company ____________ Telephone ____________
Address ____________
City ____________ State ______ Zip ______
Check one: ☐ End User ☐ System House ☐ Dealer ☐ Distributor
Send to: cLINE Inc., 20 West Ontario, Chicago, IL 60610-3809
Telex 516315 Phone (312) 944-4510
In Canada: cLINE Canada, Inc. Complexe La Laurentienne,
425 St. Amable, Suite 165, Quebec, Canada G1R5E4
Phone (418) 524-4641

C4084

cLINE™, Inc.

Speaker gives tips on buying, installing local nets

CW AT FOAC

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Organizations looking to install a local-area network should steer clear of vendors likely to fall victim to the forthcoming shakeout and should recognize that network vendors generally provide no support after the sale, according to Connie Zuckerman, a senior consultant with Arthur Anderseo & Co. here.

In a comprehensive presentation at the recent Federal Office Automation Conference here, Zuckerman provided attendees with tips on selecting and installing local-area networks based on her experience in OA projects.

She asserted that OA managers frequently underestimate the amount of time and effort required to implement a local-area network. A successful project, she said, will require a careful OA systems development methodology that includes planning, design, installation and systems management phases.

Zuckerman made the following suggestions for avoiding pitfalls in each stage:

- In the planning phase, create a steering committee with members from the data processing, communications, office automation and user staffs. Determine user requirements for applications software, security and outside data bases, as well as the technical requirements and size of the system.
- Do not let the technology — or the vendor's sales pitch — drive the decisions; make decisions based on user requirements.
- Evaluate the vendors, keeping in mind the coming shakeout.
- Design, install and test a prototype network, especially for large networks.
- Do not neglect systems administration once the network is installed. It is a time-consuming job that requires assigning responsibility for network planning and security; providing user-friendly documentation; establishing procedures, such as for backup and recovery; and user training.

Another speaker, Walter H. Mackie of the U.S. Navy, agreed, saying the network vendors are motivated only to make more sales, not to provide user support.

Mackie, who is deputy director of the Navy Secretariat's office automation and communications system, described his efforts to develop a local-area network to serve the Navy and Marine Corps headquarters commands in the Washington, D.C., area. A multivendor pilot version of the network is expected to be implemented in fiscal years 1985 and 1986, he said.

Zuckerman CW Photo by M. Betts

In addition, Mackie said his office has developed a Document Interchange Format (DIF) standard to permit the exchange of text between systems supplied by different vendors.

He described the DIF as a "software filter programmed by each vendor to allow conversion to and from the agreed-upon standard."

Datapoint Corp., Wang Laboratories, Inc. and Xerox Corp. were recently validated as complying with the DIF, Mackie said.

ICCA lists firms on-line

ST. LOUIS — The Independent Computer Consultant's Association (ICCA) has put the national directory of its 1,500 member firms on-line with the Compuserv Corp. videotex service.

The action will permit Compuserv users to seek out ICCA consultants on the basis of the consultant's specialization, location, personal or company name or other criteria.

ICCA members are all full-time consultants, the association said, adding that 60% of the membership specializes in commercial consulting and 40% specializes in scientific consulting.

More information is available from ICCA through Box 27412, St. Louis, Mo. 63141.

Electronic mail, EFT demand tighter security controls

CW AT FOAC

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Security experts told attendees at the recent Federal Office Automation Conference (Foac) here that the emergence of electronic mail, local-area networks and electronic funds transfer (EFT) have all heightened the need for hardware and software security controls.

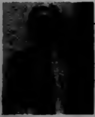
"A lot of corporations would like to use electronic mail . . . but they're afraid to. They are concerned about who has access to it, so they are willing to use electronic mail for routine matters, but not for sensitive matters," observed Stephen T. Walker, president of Trusted Information Systems, Inc. of Glenwood, Md.

Walker, a former Department of Defense official, urged OA managers to establish classifications for the sensitivity of business information much as the military does, and then obtain computer operating systems that control each person's access to each category of data.

He pointed out that the Department of Defense Computer Security Center at the National Security Agency in Fort Meade, Md., has an evaluation and rating system for security software products (CW, Sept. 17).

These trusted computer systems should be part of an overall program that includes physical, procedural and personnel security, he stressed.

Another important security area is the encryption of data communications, Walker said, noting that the U.S. Department of the Treasury recently established a new policy to assure the integrity of the department's EFT data.


Walker

Treasury Secretary Donald T. Regan, in an Aug. 16 directive, said that by June 1988 all Treasury Department EFT transactions must be authenticated, conforming to the Ansi Standard X9.9 for Financial Institution Message Authentication and the National Bureau of Standards (NBS) Data Encryption Standard. Dennis Branstad, manager of computer integrity and security technology at the NBS, said that this requires the EFT message to be sealed so that any replacement, reordering, deletion or repetition of the message or characters can be detected.

Dennis Steinauer, a computer scientist at NBS, discussed the security implications of the proliferation of desktop personal computers, each one equipped with user-friendly features that make security difficult.

Steinauer emphasized that personal computers typically lack the built-in security features that mainframe computers have, such as multiple processor states, privileged instructions and memory protection. "Without such hardware features, it is virtually impossible to prevent users from accessing or modifying parts of the operating system. Therefore, users can circumvent any software controls," he said.

Steinauer said there are products on the market that can mitigate security concerns about personal computers. He noted that next year NBS will issue federal guidelines for the security of small computer systems, and it is working on standards for password usage, data integrity and local-area network security.

Choice of micro vs. workstation

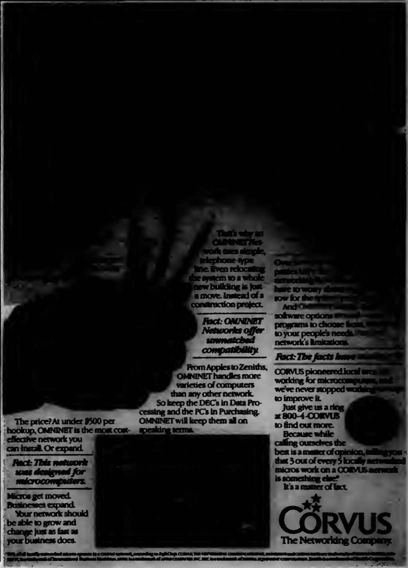
By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The office automation market has evolved to the point where personal computers and advanced workstations can both find niches in large organizations, according to speakers at the recent Federal Office Automation Conference here.

Deborah L. Fain, vice-president of Samna Corp., an Atlanta-based vendor of office software for microcomputers, stressed that a personal computer is a flexible, generic product, while a workstation is designed to be part of a total system aimed at a specific type of user.

Evaluating both forms of end-user computing, Fain said that the flexibility of the personal computer's open architecture makes it a more versatile tool than the workstation.

The personal computer's open architecture encourages the use of innovative software and peripherals. "The advanced workstation integrates all the hardware and software that the job function demands" in a closed architecture that does not easily accept enhancements, she said.



INTERNATIONAL REPORT
CW International News Network

JAPAN

TOKYO — Japan's Big Six computer makers have reported glowing financial results for fiscal year 1984. Leading the pack was Mitsubishi Electric Corp., which showed a 53% growth in computer-related sales from the same period in 1983. All six companies increased office automation sales in Japan as well as computer sales abroad. Fujitsu Ltd. has grown 28%; NEC Corp. has increased 28%; sales at Hitachi, Ltd. are up 25%; Toshiba Corp. is up 25%; and Oki Electric Industry Co. showed an increase of 20%.

■

TOKYO — The recent Fifth-Generation Computer System International Conference here focused on the programming language Prolog, along with the development of a parallel processing machine, artificial intelligence and future international cooperation. Progress on Japan's own fifth-generation project at the Institute for New Generation Computer Technology (Icot) was discussed. The Icot AI machine is said to feature a conversation function and an inference function.

■

TOKYO — Fujitsu, Ltd. has introduced a net environment called Fujitsu Network Architecture 4 (FNA4) that is said to provide integrated information systems with the following five communications capabilities: wide-area networking, large-scale networking, access to corporate information net systems, local-area networking and standardization. FNA4 can support satellite communications, videotex communications, digital transmission services and facsimile services. The net is reportedly capable of supporting up to 10,000 terminals.

KOREA

ICHON — Hyundai Semiconductor and Western Design Center, Inc. (WDC) have entered a technology exchange agreement involving WDC's 8- and 16-bit Cmos versions of the 6502 microprocessor. Under the terms of the agreement, Hyundai will manufacture and market the WDC devices here and also in its new Santa Clara, Calif. facility.

THE NETHERLANDS

AMSTERDAM — The European market for professional micros will see a tenfold growth in a six-year period, according to a recent report from International Data Corp. here. The study also revealed that the relative market shares of 8- and 16-bit systems will be reversed by 1989. The Netherlands had an installed micro base totaling 18,500 in 1983 and an average annual growth rate of 54%, which will result in an installed base of 250,000 by 1989. It is estimated that the nearby Belgian market will grow annually by 47%.

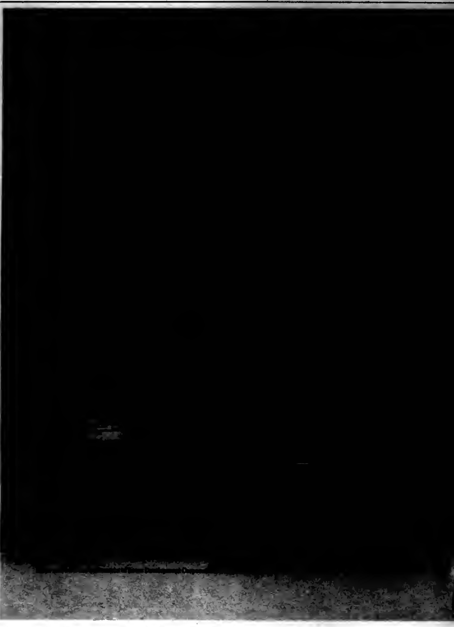
■

AMSTERDAM — The Dutch group Philips Information Systems, Inc. and the German group Siemens AG will cooperate in the joint research and development of high-density memory chips. The vendors' five-year project will focus on the production of 1M- and 4M-bit memory chips at facilities in Nijmegen, Netherlands, and in Hamburg, West Germany. Both companies are expected to invest roughly $150 million, with additional funding coming from the two countries' governments.

■

THE HAGUE — Deregulation of the Dutch telecommunications industry has become a hot topic here, sources said. An investigative committee contacted the research group McKinsey, Inc. to complete a future-status report before mid-1986. The Postal Telephone and Telegraph (PTT) agency will retain its monopoly on telecommunications, telex and data infrastructures, but will lose control of peripheral equipment.

Furthermore, the financial relationship between the PTT and the government will be loosened. The future structure of communications here will be built around three entities: a public entity, an entrepreneurial entity and the ruling entity modeled after Oftel in the UK.



CALENDAR

WEEK OF NOV. 25

NOVEMBER 26-27, INDIANAPOLIS — Expanding Lotus 1-2-3 Applications. Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940.

NOVEMBER 26-28, CHICAGO — Cellular Communications '84: The Industry Conference. Contact: Online Conferences, Inc., Suite 1190, 2 Penn Plaza, New York, N.Y. 10121.

NOVEMBER 26-28, SAN FRANCISCO — Computer Graphics for Business. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

NOVEMBER 26-28, PINE MOUNTAIN, GA. — Data Communications: Bringing You Up To Date. Contact: Institute for Communications and Information Management, P.O. Box 8, Pine Mountain, Ga. 31822.

NOVEMBER 26-28, WASHINGTON, D.C — Integrating Microcomputers into Corporate Environments. Contact: Systems Technology Forum, 9000 Fern Park Drive, Burke, Va. 22015.

NOVEMBER 26-28, TEANECK, N.J. — Project Management Control. Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

NOVEMBER 26-29, COLUMBIA, MD. — Data Base Machines: In-Depth. Contact: Continuing Education Institute, 10889 Wilshire Blvd., Los Angeles, Calif. 90024.

NOVEMBER 26-29, LOS ANGELES — Data Communications: Components, Systems and Networks. Contact: Institute for Advanced Technology, 65 W. 55th St., New York, N.Y. 10019.

NOVEMBER 26-29, COLUMBUS, OHIO — DOS/VSE with Explore/XP. Contact: Education Coordinator, Goal Systems International, Inc., 5455 N. High St., Columbus, Ohio 43214.

NOVEMBER 26-30, BOSTON — Systems Analysis. Contact: QED Information Sciences, Inc., P.O. Box 181, 170 Linden St., Wellesley, Mass. 02181.

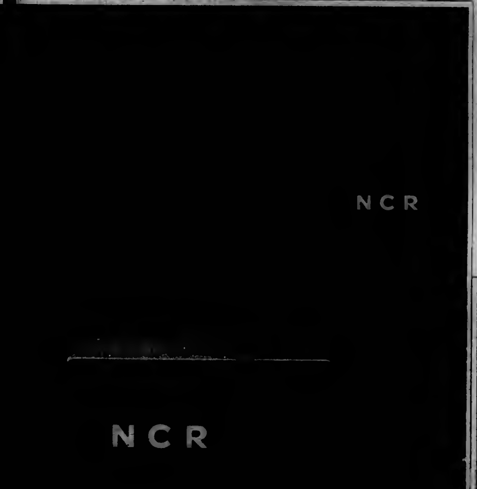
NOVEMBER 26-30, NEW YORK — IMS Data Base Design. Contact: Sysed, Inc., 25 W. 35th St., New York, N.Y. 10001.

NOVEMBER 27-28, TAMPA, FLA. — Realistic Applications of Personal Computers in Business. Contact: Lucy Bell Burton, Peat, Marwick, Mitchell & Co., 810 Seventh Ave., New York, N.Y. 10019.

NOVEMBER 27-28, CHICAGO — IBM vs. AT&T: Round One. Contact: Marilyn Chasteen, The DMW Group, Inc., 2020 Hogback Road, Ann Arbor, Mich. 48104.

NOVEMBER 27-29, FT. LAUDERDALE, FLA. — Telephone Systems: Their Selection, Operation and Management. Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

NOVEMBER 27-29, CAMBRIDGE, MASS. — The 1984 Hammer Information Systems Conference. Contact: Hammer and Co., 5 Cambridge Center, Cambridge, Mass. 02142.



EDITORIAL

Comdex: pacing micro evolution

Perhaps the only part of the computer business that has evolved faster than the business itself over the past few years is the annual fall Computer Dealers Exposition, also known as Comdex. This harvest home of the microcomputer season started last Wednesday and ended just yesterday, and show sponsors were expecting some 100,000 attendees to converge on the miles of aisles lined with some 7,000 (yes, seven thousand) display booths.

Comdex has come to serve as a compass from which readings of the direction of the microcomputer business can be accurately taken. True to this form, the show's beginnings six years ago were marked by negligible interest on the part of serious business users, as the micro was more a toy of the hobbyist than anything else. Last week, the eyes of corporate DP management were focused on the networking achievements that vendors brought to Las Vegas, as managers continue to grapple with the increasingly complicated issues of integrating into mainframe environments the millions of micros now installed in major companies everywhere.

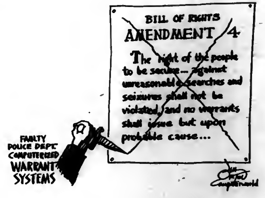
Comdex has also borne out the cyclical nature of the micro business, where a rash of hardware announcements one year has been followed by an onslaught of software operating system and application software debuts, which, in turn, are followed by the next generation of hardware. For example, in 1982, Comdex was predominantly a hardware extravaganza, where dozens of vendors dragged their IBM Personal Computer look-alikes out of the laboratories and onto the show floor.

In 1983, software to run on the Personal Computer and compatibles highlighted the show, while IBM and others were preparing the next round of more powerful 16- and 32-bit micros, with IBM continuing to pull the micro business in its wake. In fact, according to one report, there were approximately 10,000 IBM Personal Computers on the Comdex floor last year, demonstrating the pride of the software vendors.

In 1984, Comdex featured not only the much more sophisticated integrated packages supported by these high-powered machines, but also the communications software that micro managers are demanding. The hardware featured at the show was not computers, but elegant laser printers, which today can be had for under $5,000, compared with $30,000-plus just a couple years ago.

And now, of course, the traditional mainframe software and hardware vendors are the ones that stand out in the Comdex crowd, as the show has taken on more the appearance of the National Computer Conference than a dealers' confab. For those attending the show, this proves more a nightmare than a blessing.

Finally, it is worthy of mention that, despite an actively ongoing shakeout in the microcomputer business, more vendors (1,400) than ever were exhibiting at Comdex.


BILL OF RIGHTS
AMENDMENT 4
The right of the people to be secure... against unreasonable searches and seizures shall not be violated, and no warrants shall issue but upon probable cause...
FAULTY POLICE DEPT. COMPUTERIZED WARRANT SYSTEMS
Computerworld

LETTER

Avoiding memory loss in 4381 upgrade

The article, "IBM DOS/VSE users lose memory in 4381 conversion" [CW, Oct. 29] failed to mention methods for resolution of the problem. Converting E mode VSE to 370 mode is the least desirable aspect of installing a 4381 computer (due to the memory loss) and is probably the most difficult approach.

The easiest solution is to install the VM/SP that will support the VSE E mode processing on the 4381. While additional cost and processing overhead is incurred, the simplicity of a straight hardware installation is possible, without major concern given to extensive operating system conversion and testing. In addition, for the users that are under severe virtual storage constraints, the VM/SP offers another avenue for memory expansion without converting to an operating system with extended addressing capability or waiting for the new VSE/SP release that supports the Extended Architecture.

I suspect, however, the whole idea of the article was not to warn future 4381 users of virtual storage loss as much as it was intended to take a shot at IBM and their marketing practices. I would be the last person to say that IBM support offers complete satisfaction, but for the user who knows how to ask the appropriate questions, timely guidance and advice can be obtained. The key to asking the right questions is full and complete information from a variety of sources.

David J. Ballard
Jackson, Mich.

COMPUTERWORLD

Donald E. Fagan
Publisher

Editor
John C. Whitmarsh

Executive Editor
Rita Shoor

Managing Editor
Bill Laberis

Assistant Managing Editor
Donovan White

Senior Editors:
Software
Paul Gillin
Communications
John Dix
Systems
Tom Henkel
Microcomputers
Eric Bender
Industry
Peter Bartolik
Features
George Harrar
Design Editor
Marjorie Magowan
International Editor
Susan Blakeney
Associate Features Editor
Barbara Van Scoyoc
Assistant Features Editor
Elizabeth Morse
Special Reports Editor
Janet Fiderio

Assistant Special Reports Editor
Becky Batcha
Senior Writer
John Gallant
Staff Writers:
James Connolly
John Desmond
Paul Korzeniowski
Maura McEnaney
David Olmos
Donna Raimondi
Edward Warner
Correspondents:
New York
Correspondent:
Charles Babcock
Paramus Plaza I
140 Route 17 N.
Paramus, N.J. 07652
201/967-1350
Washington, D.C.
Senior Correspondent:
Bryan Wilkins
Correspondent: Mitch Betts
1273 National Press
Building
529 14th St., N.W.,
Washington, D.C. 20045
202/347-6718
West Coast
Bureau Chief: Jeffry Beeler
Correspondents:
Kathleen Burton
Kathleen Sullivan
1060 Marsh Rd.
Menlo Park, Calif. 94025
415/[illegible]
Chief Copy Editor
Kathie Gow
Assistant Chief Copy
Editor
Charlotte Ziems
Copy Editors:
Christine Casatelli
Deborah Fickling
Patricia Heal
Penny Janson
Joseph Stalvey
Barbara Sutton
Kimberly Valloch
Lory Zottola

Assistant to the Editor
June Fettig
Editorial Assistants:
Lorraine Brien
Cheryl Tynan
Contributors
Education
J. Daniel Couger
Human Connection
Jack Stone
Turnaround Time
Larry Long
Microcomputers
Thomas Madron
The Data Center
John P. Murray
Lecht on Software
Charles P. Lecht
Special Publications
Computerworld Extra!
George Harrar, Editor
Computerworld on
Communications
Bruce Hoard, Editor
Computerworld Focus
Ann Dooley, Editor

Main Editorial Office: Box 880, 375 Cochituate Road, Framingham, MA 01701 617/879-0700

Computerworld is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 53 computer publications in 24 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentina; Asia's The Asian Computerworld; Australia's Computerworld Australia, Australian Micro Computerworld, Australian PC World and Directories; Brazil's DataNews and Micromundo; China's China Computerworld; Denmark's Computerworld Danmark and [illegible]

CW Edition/Seminar, Computer Business and Communications Magazine; [illegible] *the UK's Computer Management, Computer News and Computer Business Europe; the U.S.' Computerworld,* [illegible]

VIEWPOINT

Software escrow not a guarantee for protection

READER'S PLATFORM
L.J. Kutten

The article "Firm utilises software escrow for access control" [CW, Oct. 29] gives the unwarranted impression that software escrow can be a panacea that will protect a software developer's proprietary information while at the same time guaranteeing "access by interested parties in case of product discontinuance, bankruptcy, theft and copyright and trade secret infringement."

Based on my research, this just is not always true. As an analysis of each issue could easily take 70 pages, I will explain the ramifications of a software developer's bankruptcy on a software escrow agreement.

For the purpose of further discussion, the three following assumptions are required:

- The software developer (the escrower) has filed for bankruptcy, either voluntary or involuntary, or for corporate reorganization.
- A bankruptcy trustee has been appointed, and the escrow agreement calls for delivery.
- The agreement calls for delivery of the escrowed material upon the escrower's filing for bankruptcy.

Unless the escrow company has been formally authorized to take charge of the debtor's property for the general benefit of the debtor's creditors (usually by contract or court order), it is deemed a noncustodian of the debtor's property. Typical noncustodians include bailees, pledgees, a co-owner and an escrow holder.

As long as the debtor retains any title to the property at the time of the bankruptcy filing, the property belongs to the debtor's estate. This property includes all property in which the debtor has any legal or equitable interest, including any interests in copyrights, patent rights, trademarks and trade secrets.

Accordingly, the bankruptcy trustee can require a noncustodian to turn over to it all property of the estate, including any software held in escrow.

If the escrow company is a custodian and has knowledge of the bankruptcy, then under 11 U.S.C. 543, it must take appropriate steps to preserve and protect the property (for example, refuse to turn it over to the software consumer), and it must turn the property over to the trustee.

> *So long as the debtor retains any title to the property at the time of the filing, the property belongs to the debtor's estate. This property includes any interests in copyrights, patent rights, trademarks and trade secrets. Accordingly, the bankruptcy trustee can require a noncustodian to turn over to it all property of the estate, including any software held in escrow.*

The fact that the escrow beneficiary has a contract with the debtor/escrower is unimportant. Under 11 U.S.C. 365 (a), a bankruptcy trustee may assume or reject an executory contract (that is, a contract in which both sides have a future obligation).

For example, Select-A-Seat Corp. developed and marketed a software package that allowed for remote sales of athletic and entertainment tickets (625 F2d 290, 9th Cir. 1980). In November 1975, Select-A-Seat sold exclusive rights to Fenix to use and license others to use Select-A-Seat's software. This right was contingent upon Fenix paying Select-A-Seat $140,000 plus a promise to pay 5% of the income generated for 10 years. In addition, Select-A-Seat promised not to provide the program to any other party.

On Dec. 3, 1976, Select-A-Seat filed for bankruptcy. On May 19, 1977, the trustee rejected the licensing agreement as executory. Fenix appealed, claiming it was not executory because it had paid and received an exclusive license to the program. The appeals court reject this and said the contract was executory because Fenix had a continuing duty to pay a royality, and Select-A-Seat had a duty not to license others to use the program.

As a result, the trustee was allowed to sell and/or license the program to others. As a general rule, if the software is usually updated, and the updating is required by contract, that contract is executory. If it is executory, the software license agreement can be rejected. If it is rejected, the license cannot protect the nondelivery of the escrowed material.

Trustee may sell debtor's assets to third party

The trustee can also sell the assets of the debtor to a third party, notwithstanding any provision in the original escrow agreement or licensee agreement to the contrary.

The only caveat is that where the debtor only holds legal title to the property and it is being held for the benefit of another, the trustee may not sell the property if the sale will be detrimental to the beneficial owner [see 11 U.S.C. 541(b)].

It should be noted that bankruptcy law 11 U.S.C. 541(c) specifically prohibits any contract language that purports to transfer the property of the debtor to any other party that is "conditioned on the insolvency or financial conditions of the debtor . . . or on taking possession [of the assets] by a trustee."

Finally, an escrow beneficiary cannot immediately sue the escrow service or the supplier in a local court to compel delivery of the source code and documentation.

The bankruptcy court has exclusive jurisdiction over all property of the debtor and all issues and cases that affect or concern the property of the debtor. If the user wants to sue, he must do so in a bankruptcy court. ‡

Kutten is a computer law consultant and a member of the Illinois and Missouri Bars. He is the author of the Computer Buyer's Protection Guide.

DP center must gird for challenge of OA implementation

HUMAN CONNECTION
Jack Stone

Automating the office has become a mighty challenge for the best of today's technical minds. The issue of dealing with the convergence of word processing and data processing technologies, which have dominated the industry for so long, has been compounded by the necessary consideration of multiple technologies that have either reached a reasonable level of maturation or will do so soon.

These days, it does not make sense to initiate office automation planning without taking into account the many cost-beneficial alternatives (and the following list is not intended to be all-inclusive):

- Electronic mail systems configured with facsimile devices and optical character scanners to transmit combined typewritten and handwritten text plus graphics material.
- Devices of various levels of intelligence for remote access to office-level computer facilities, including notebook computers and cellular radiotelephones.
- Powerful personal computers with integrated applications software and a broad range of communications add-ons.
- Combined voice, data and video workstations and switching devices for a variety of applications within local-area networks.

Rapid-fire OA developments

In spite of these rapid-fire developments, many leaders of large organizations do not appreciate that, nowadays, the complexities of systems planning for office automation projects are approaching those of large-scale mainframe projects. This should not come as a great surprise because of the growing processing power of office systems.

Therefore, to do the OA planning job right, the organization requires much the same kind of talent that is found in the DP center systems analysis department. And that's where the executives figure they will go to pry loose the OA analysis capability. If your DP center has not yet felt the pressure to divert preciously guarded systems people to OA, then take heed — they soon will.

Not surprisingly, OA analysts have difficult tasks ahead because, as is the case for mainframe systems analysts, their attention is directed as much to management, personnel and organizational matters as to issues dealing with the technology. The first need in this situation is to identify realignments in the current flow of information processing to take full advantage of the new OA connection. This effort is, of course, well established in the mainframe systems planning cycle. Such changes may require as little as a few minor modifications in existing manual procedures or as much as a divisional reorganization.

But as we have all come to learn, mostly the hard way, getting office users to change the ways they have done business, however slightly, is not accomplished overnight and may take years, particularly when manual procedures have been operative for decades.

To implement such changes, OA analysts must be unusually gifted in dealing with people. They should be able to relate easily to office users during the entire systems development process and be available to offer assistance to make users' jobs easier and their time more productive. OA analysts ought to be capable of convincing managers and supervisors of the value of an OA project by relating the prospective implementation of new technologies to one of the following:

- Improvements in operations.
- Decreases in operating expenses.
- Expansions in services to customers or constituencies.

Finally, the OA analyst should be experienced in training and possessed of the patience and sensitivity necessary to deal with non-DP-oriented professionals in an effective way during OA implementation. ‡

Stone is an independent management consultant, educator and writer, specialising in DP human communications and personnel development, based in Washington, D.C.

COMPUTERWORLD READER QUIZ

YES NO

☐ ☐ 1. Is *Computerworld* on your desk <u>every</u> Monday morning?

☐ ☐ 2. Do you receive special focus issues every other month?

☐ ☐ 3. Do you know about the latest job position announcements? (when you've still got time to send your resume)

☐ ☐ 4. Can you rely on *Computerworld Buyer's Guides** for product information? . . .

☐ ☐ 5. Do you know the <u>very</u> latest news in the computer field?

If you've answered **NO** to any of the above, you're probably reading someone else's issue of *Computerworld*. Don't you need your own? When you're a subscriber, we'll guarentee that *Computerworld* is on your desk <u>every</u> Monday morning. And, what's more, as part of your subscription, you'll receive <u>all</u> of our special-focus publications.

Now's your chance to say YES! Subscribe today for a full year of Computerworld at our special introductory rate of $39 (save $5 off the $44 annual subscription rate).

Complete Form On Reverse, Then Return In Attached Postage-Paid Envelope. Or Use Your Charge Card and Call TOLL-FREE: 1-800-343-5730.

I'm already a subscriber, but I'd like you to change my:

☐ **address** ☐ **industry** ☐ **title** ☐ **other**

Put old label or label information here

My current mailing label is attached and I've filled in new information on the other side.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

*U.S. Only

CW-138

Please send me COMPUTERWORLD for one year. RATES: United States ~~$44;~~ Canada, Central & South America $110; Europe $165; All Other Countries $245 (Airmail Service)

Special Introductory Offer — Only $39.00 Save $5.00

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC (MC Only List four digits above your name)

If charge we must have cardholder's signature ______________ Expiration Date ______

First Initial ___ **Middle Initial** ___ **Surname** ______________
Your Title ______________
Company Name ______________
Address ______________
City ______________ **State** ___ **Zip Code** ______

Address shown is
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*

☐ Check here if you're interested in receiving information on *Computerworld's* Index

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Box 897,
Framingham, MA 01701-9985

Detach here, moisten and seal envelope securely before mailing.

1. **BUSINESS/INDUSTRY (Circle One)**
   End Users
   - 10 Manufacturer (other than computer)
   - 20 Finance/Insurance/Real Estate
   - 30 Medicine/Law/Education
   - 40 Wholesale/Retail Trade
   - 50 Business Service (except DP)
   - 60 Government—State/Federal/Local
   - 65 Public Utility/Communication Systems/Transportation
   - 70 Mining/Construction/Petroleum/Refining
   - 75 Other User ______

   Vendors
   - 80 Manufacturer of Computers, Computer-related Systems or Peripherals
   - 85 Computer Service Bureau/Software/Planning/Consulting
   - 90 Computer/Peripheral Dealer/Distributor/Retailer
   - 95 Other Vendor ______
2. **OCCUPATION/FUNCTION (Circle One)**
   - 11 President/Owner/Partner/General Manager
   - 12 VP/Assistant VP
   - 13 Treasurer/Controller/Financial Officer
   - 21 Director/Manager/Supervisor DP/MIS Services
   - 22 Director/Manager of Operations/Planning/Administrative Services
   - 23 Systems Manager/Systems Analyst
   - 31 Manager/Supervisor Programming
   - 32 Programmer/Methods Analyst
   - 33 OA/WP Director/Manager/Supervisor
   - 34 Data Comm Network/Systems Mgmt
   - 41 Engr/Scientific/R&D/Tech Mgmt
   - 51 Mfg Sales Reps/Sales/Marketing Mgmt
   - 60 Consulting Mgmt
   - 70 Medical/Legal/Accounting Mgmt
   - 80 Educator/Journalist/Librarian/Student
   - 90 Other ______
3. **COMPUTER INVOLVEMENT (Circle all that apply)**
   Types of equipment with which you are personally involved either as user, vendor or consultant
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Office Automation Systems

CW-138

SOFTWARE & SERVICES

Hobbyist makes program development look easy

By Paul Gillin
CW Staff

TULSA, Okla. — At Clyde Petroleum, Inc. here, petroleum engineer Jack Coursey is bringing new meaning to the words "end-user computing." Coursey, a longtime computer hobbyist with no formal DP training, has replaced a data base application originally written on an IBM System/34 with a similar one he developed on an IBM Personal Computer XT using a high-level programming language and data base management system.

With no experience in formal development, Coursey basically used the prototyping capabilities of PC/Focus to make changes.

Coursey's application is a storage and retrieval program for production data for oil and gas wells. The data base encompasses information about oil, gas and water production data, test data, lease background information and information about division of interests. It will eventually encompass about 700 wells. Coursey used Information Builders, Inc.'s PC/Focus to build the data base.

The application uses three data bases that can be dynamically linked for reporting, Coursey said. The data bases include lease data, production and test data associated with leases and an inventory data base of field equipment. "If I want the total history of a well sorted by county, for example, I have to pull more than one data base to do it," he said. "I've got well over 200 leases on the data base right now."

To handle the size of the data base, Coursey added a Tallgrass Technologies Corp. 45M-byte hard disk to the Personal Computer XT. The engineer relied largely on past experiences and common sense to design the application. "You basically draw a flow chart of how you want to look at data, and that's how you want to store it," he said.

To test for accuracy, Coursey wrote programs on PC/Focus that generated reports similar to those already employed on

See FOCUS page 38

SOFTLINE
T Capers Jones III

Productivity gauge changing

Since 1981, a new kind of software productivity benchmark called "function points" has started to replace "lines of source code" as a standard measure for software productivity. The reasons for this, and what is likely to result from the switch, are turning out to be very significant.

From the time that software production began more than 30 years ago, measuring the productivity of software projects has been a major problem. During the early years of professional programming, measurements based on lines of

See MEASURE page 36

Jones is a consultant for Nolan, Norton & Co. in Lexington, Mass., and the author of two books and more than 30 articles and reports on software quality and productivity. He is a regular contributor to Softline.

■ Computer Associates International, Inc. has announced Release 2.1 of the CA-Universe relational data base management system/34

INSIDE

Micro Tempus revamps micro-mainframe link

MONTREAL — Micro Tempus, Inc. has announced what the company labeled a totally redesigned version of its Tempus-Link microcomputer-to-mainframe link that features improved performance and additional functions.

According to a spokesman, Version 3.1 of Tempus-Link offers performance capabilities that include more efficient use of terminal buffers, shorter path lengths between modules and improved translation and compression algorithms. The performance features are said to increase mainframe capacity and capability. Tempus-Link supports a variety of mainframe operating environments, including IBM's CICS, TSO and CMS and the entire line of IBM and IBM-compatible micros.

The spokesman said other additions to Tempus-Link include a translation table, a conversational tutorial and full screen presentation and windowing capabilities that make the link easier for end users to operate. Version 3.1 also comes with the Tempus-Link Application Program Interface (API) and Host Application Program Interface (Hapi).

Permit integration of environments

The two interfaces permit integration of the micro and mainframe environments. They allow the user, for example, to write micro programs that call mainframe applications as subroutines, which are then reportedly transferred to the micro program transparently to the user.

The spokesman said Version 3.1 also allows users to configure programs according to a variety of options. Beginners are guided through a series of tutorial menu choices when they access the system, and experienced users can move more quickly through Tempus-Link by bypassing familiar options, the spokesman said. An additional enhancement to the system, which the spokesman described as a statistics capability, enables users to generate information about the transmission of data, including speed and efficiency of data transfer, number of errors and other information.

Version 3.1 of Tempus-Link is priced incrementally on the basis of maximum concurrent users. A basic five-user version is priced at $6,175. A 100-user version costs $39,000. The next increment of 100 users is priced at $11,700. Users of the complete Tempus-Link 2.0 product, including Hapi and API, can upgrade to Tempus-Link 3.1 at no charge. Other Tempus-Link users can upgrade to Version 3.1 for a 30% charge as long as their minimum configuration is five users.

Micro Tempus is located at Suite 300, 440 Dorchester Blvd. W., Montreal, Quebec, Canada H2Z 1V7.

AT&T compiles Unix definitions for software developers

NEW YORK — AT&T Information Systems has announced that it will publish a definition document for its Unix System V. The document is intended to serve as a guide for software developers who want to write applications that are portable across the various System V implementations.

The "System V Interface Definition" will define a minimum set of system calls and library routines that should be common to all operating systems based on Unix System V. The initial document will be released in January at a nominal charge, according to an AT&T spokesman. It will be followed by further papers defining optional extensions to the basic definition.

The communications giant also said it will offer a service to help system developers conform to the System V Interface Definition. The service will be made available to System V licensees during 1985. It will test implementation of Unix System V for conformance to the definition.

Boosting a solid commitment

"It is letting the entire computer community know that [AT&T is] solidly committing [itself] to a standardized System V Unix," said Harry Layton, software systems product verification manager for AT&T Technologies.

Unix observers and software developers said the announcement should not be taken as a significant statement about Unix. "I think it's a nonevent," said David Fiedler, editor of "Unique," a Unix newsletter. "I don't think it's anything new because it's stuff that's been available all along."

However, Fiedler said the specifications should provide some reassurance to developers. "Before, they could just copy the system calls. This gives them an added reassurance that what AT&T says is going to be the actual interface."

Jeff Stives, marketing communications manager at Plexus Computer, Inc. said the usefulness of the standard will depend upon AT&T's commitment to adherence. "For the moment, issuing a spec and adhering to it are two different things," he said. But he added, "Each time AT&T ups the ante on Unix, it benefits our market."

CA-Universe upgrade released

JERICHO, N.Y. — Locking algorithms, IBM Vsam transparency and support in IBM's VM/CMS for multiple minidisks are among the enhancements included in Computer Associates International, Inc.'s Release 2.1 of CA-Universe relational data base management system.

According to the company, users of IBM's DOS/VSE do not have to modify programs using Vsam files while CA-Universe's transparency feature is being used.

All security and recovery systems, such as IBM CICS journaling and CICS automatic transaction backout, reportedly continue to run while the system's transparency capabilities are utilized. In addition, the release is said to require no modification to CICS or C.. functions.

Supports multiple disks

The enhanced release is said to support multiple minidisks within VM/CMS or the CA-Universe data base. A multiextent data set has been implemented so that one data base table can now span multiple minidisks, the company said.

CA-Universe is priced at $140,000 for IBM's OS/VS, MVS and VM/CMS operating systems. The product costs $110,000 for the DOS/VSE environment.

Computer Associates International is located at 125 Jericho Tnpk., Jericho, N.Y. 11753.

SYSTEMS SOFTWARE

CALIFORNIA SOFTWARE, INC.
Netman 3.0

California Software, Inc. has released a version of its on-line data communications and data center management system.

Netman 3.0 is said to include more than 50 enhancements, including reverse paging, faster mass updating capabilities and a faster response time. The new version also includes an optional On-line Customization Facility. The product supports IBM's MVS/TSO, MVS/CICS, VS1/CICS, VM/CMS and DOS/VS/CICS.

The software update is available to Netman users free of charge. The On-line Customization Facility will be offered to existing users until Dec. 31 at $15,000 for a perpetual license. After that date, the price of the option to existing and new users will be $20,000. A perpetual license for the Netman 3.0 for the MVS operating system remains at $37,500.

California Software, 3232 Nebraska Ave., Santa Monica, Calif. 90404.

UNIQUE AUTOMATION PRODUCTS, INC.
UAP-Link enhancement

Unique Automation Products, Inc. has announced that its UAP-Link micro-to-mainframe communications software now runs with Digital Equipment Corp. VAX-11 systems under DEC's VMS operating system.

According to the vendor, UAP-Link now permits VAX systems to transfer files to another VAX or to control groups of micros or interconnect with other vendors. The link is said to work on IBM Personal Computers and compatibles, DEC Rainbow microcomputers running under Microsoft Corp.'s MS-DOS operating system and Digital Research, Inc.'s CP/M 86 operating system.

It also runs with DEC's PDP-11 minicomputer, as well as under Unix operating systems, IBM's VM/CMS operating system and Data General Corp.'s AOS/VS operating system, the company said.

The new release includes both control and host modules and is priced at $1,250.

Unique Automation Products, Suite G, 15401 Red Hill, Tustin, Calif. 92680.

NETWORK APPLICATIONS, INC.
Transnet enhancement

Network Applications, Inc. has announced that its communications software now runs with office systems from Digital Equipment Corp. and Data General Corp.

According to Network Applications, through the use of IBM's Document Interchange Architecture and Document Content Architecture, Transnet allows multiple-vendor office systems to communicate through the host's IBM Systems Network Architecture Distribution Services. Transnet permits office systems from IBM, Wang Laboratories, Inc. and Xerox Corp. to exchange text documents, which can then be edited by any of the systems.

In addition to DG's CEO office system and DEC's All-In-One office system, electronic mail systems from the two companies will also be usable with any Transnet-supported systems from DEC, DG, IBM or Wang Laboratories.

Transnet has a base price of $35,000.

Network Applications, 9020 Capital of Texas Highway N., Austin, Texas 78759.

WHITESMITHS, LTD.
Enhancements to Pascal and C compilers

Whitesmiths, Ltd. has announced that its Pascal and C compilers for IBM 370 mainframes have been enhanced to provide optional cross-compiler support. The company also announced that the compilers are now available for IBM's VM/CMS.

According to the company, the optional cross-compilers support the Intel Corp. 8080 and 8086 microprocessors and Motorola, Inc.'s 68000 microprocessor.

Each cross-compiler reportedly can generate free-standing programs. The 8086 option can also generate programs executable under IBM's PC-DOS operating system, the company said. The 8080 processor supports Digital Research, Inc.'s CP/M 80, and the 68000 option supports Digital Research's CP/M 68K-byte operating system, according to Whitesmiths.

The VM/CMS option is standard with the C/370, priced at $5,000. Each of the cross-compilers is priced at an additional $5,000.

Whitesmiths, 97 Lowell Road, Concord, Mass. 01742.

ADVANCED SYSTEMS CONCEPTS, INC.
Status/38

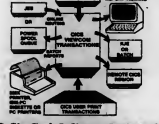
Advanced Systems Concepts, Inc. has announced a resource accounting product said to be compatible with the IBM System/38 under Release 6.0 of the CPF operating system.

The accounting features of Status/38 reportedly track all facets of system use. Total job execution time, CPU use time, response time, printer and paper use and disk space utilization are included, the company said. The product reportedly allows jobs to be grouped for departmental reporting.

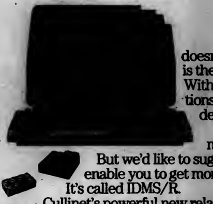
Status has a one-time license fee of $1,500, the vendor said.

Advanced Systems Concepts, Suite S, 1350 Remington Road, Schaumburg, Ill. 60195.

See SYSTEMS page 37


VIEWCOM SPOOL
USER SCREEN REPORT VIEWING
JES
OR
ONLINE ROUTING
POWER SPOOL QUEUE
CICS VIEWCOM TRANSACTIONS
BATCH REPORTS
RJE OR BATCH
REMOTE CICS REGION
328X PRINTER, IBM-PC DISKETTE OR PC PRINTERS
CICS USER PRINT TRANSACTIONS

The nicest thing about IDMS/R on a 4300 is how easy it is to build with.



It's a rare data processing department that doesn't have a backlog of applications, and nowhere is the problem more acute than among 4300 users. With fewer people typically to develop applications, fewer applications typically have gotten developed.

Adding more applications developers might seem one way to combat the problem. But we'd like to suggest a more sensible approach. A way to enable you to get more productivity out of your existing dp staff. It's called IDMS/R.

Cullinet's powerful new relational database management system, IDMS/R greatly reduces the time it takes to develop applications. Its Automatic System Facility (ASF), a major advance over fourth generation languages, is so simple to use, end users can develop applications *themselves*.

IDMS/R is also extremely flexible. It anticipates change by providing for the dynamic definition and redefinition of your relational database.

Finally, a point of special interest to 4300 users: IDMS/R conserves finite data processing resources. With a feature called "Relational Fastpath," you can tune the database and thereby benefit from a dramatic boost in performance.

For more information about IDMS/R, as well as our complete approach to information management, attend a Cullinet Seminar. You can make arrangements by calling, toll-free, 1-800-225-9930. In MA, the number is 617-329-7700.

The
Complete
Software
Solution

Cullinet: I'd like to learn more about IDMS/R.
Please arrange for me to attend a Cullinet Seminar.

Name ________________

Title ________________

Company/Department ________________

Address ________________

City/State/Zip ________________

Telephone ________________

Send to: Cullinet Software, 400 Blue Hill Drive, Westwood, MA 02090-2198

CW11184

Cullinet

We understand business better than any software company in business.

Figure 1

Figure 2

MEASURE

from page 33

source code worked relatively well. In those days, when assembler languages were the only ones available, the phrase "a line of source code" had a fairly clear definition: It was in fact a single source code statement, and it occupied a single line on a coding sheet.

However, with the arrival of Cobol, Fortran and the other compiler-based languages, a set of major problems arose that caused ambiguity about lines of source code.

While the unit of measure "lines of source code" continued to be the standard measure of productivity, it no longer had a precise definition, and the same program could vary by more than 10:1 in apparent size simply by changing the rules of line counting.

The real problem

Ambiguities in line counting are only a superficial problem and could be resolved by adopting standards. However, there is a much more serious problem with benchmarks based on lines of source code than a simple lack of standard definitions. The real problem is that such a benchmark does not work across different source languages and indeed penalizes high-level languages in direct proportion to the level of the language.

The reason for the penalty is analogous to a classic industrial phenomenon: If a manufacturing process has a high percentage of fixed costs and there is a decline in the number of units produced, then the cost per unit goes up. In software development, there are a great many activities that are not exactly fixed costs, but are not directly related to coding either: requirements, design, user documentation and so forth.

For example, assume that two identical programs are to be written — one in assembler language and the second in Pascal (see Figure 1).

Paradox occurs

Note the paradox that occurs: While the high-level language reduced the total development effort by 50% and improved true economic productivity by 50%, if productivity is measured in terms of lines of source code per month, then the improvement disappears, and the assembler language version looks twice as productive.

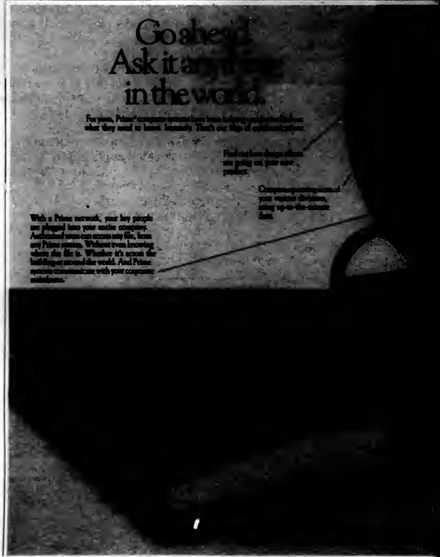
In the late 1970s, Allen Albrecht of IBM had to confront this productivity paradox. As a manager within IBM's Data Processing Services group, he was looking for a way to measure productivity that would work across multiple languages: assembler, Cobol, RPG, IBM's DMS/VS and many others.

What he came up with has come to be called "function points," the weighted sum of five major external attributes of a software program (see Figure 2).

There are some other attributes of the function point method that deal with adjustments for complexity, but they are not needed to understand the fundamental concept. Essentially, function points are like the Dow Jones market indicators — a composite number that can indicate useful trends.

Look at the previous assembler and Pascal examples in terms of function points. For both versions, the function point total will be the same. In this case, assume one of everything (see Figure 3).

Considering the previous assembler and Pascal examples, the 100 months it took for the assembler lan-



guage version can now be expressed as 0.3 function points per month. The 50 months it took to do the Pascal version yields a function point rate of 0.6 function points per month, or twice the function point rating of assembler.

For the first time in the history of computing, software productivity has a benchmark that reflects economic productivity without the mathematical paradoxes associated with measurements based on lines of source code.

Reason for significance

This is the reason why the function point method is becoming so significant: It can show the value of high-level languages in a way that is relatively free from distortion.

Not only can the function point method demonstrate the value of high-level languages, it can be used to predict the size of a program as well, in any language. For example, the approximate number of source code statements per function point for a few common languages are shown in Figure 4.

Although the current margin of error of the source code-to-function-point ratio is high, even the possibility of an accurate measure that can be used early in development is a very exciting occurrence.

The function point method is still evolving. Not only that, but the function point method has its own sources of ambiguity, and the exact definition of some of its terms, such as "inputs" and "outputs," has required a great deal of effort. Even so, the potential value of the method makes it worthy of serious exploration.

Figure 3

Figure 4

SYSTEMS from page 34

VIRTUAL MICROSYSTEMS, INC.
Bridge enhancement

Virtual Microsystems, Inc. has announced that its Bridge development system now permits Intel Corp. development languages to run on Digital Equipment Corp. VAX-11 computers.

By using the Bridge, users reportedly can compile and run Intel PL/M-86 programs from any terminal attached to a VAX-11 or other DEC minicomputer system. The program is said to allow user to work at exiting terminals and exchange programs and data via the DEC VMS operating system utilities.

Price per system is $9,900.

Virtual Microsystems, Suite 300, 2150 Shattuck Ave., Berkeley, Calif. 94704.

BUSINESS COMPUTER DESIGN, INC.
Telex-Mint

Business Computer Design, Inc. has announced a software package that reportedly gives telex processing capabilities to IBM System/34, 36 and 38 minicomputers.

The Telex-Mint communications package reportedly allows users to create telexes, cables and mailgrams from any workstation using full on-line text editing. Communications characters are said to be generated by Telex-Mint and carried over the ITT Databridge communications network. According to the company, users can send to any telex acceptance machine at rates of 2,400 bit/sec to 4,800 bit/sec with an AT&T-compatible modem.

The introductory fee for the Telex-Mint system is $1,950 for the System/34 and System/36 and $2,850 for the System/38.

Business Computer Design, 9000 Jorie Blvd., Oak Brook, Ill. 60521.

MT XINU, INC.
Enhanced 4.2BSD

Mt Xinu, Inc. has released source code software for the University of California at Berkeley 4.2 version of the Unix operating system, 4.2BSD, that adds a debugger, performance enhancements, utilities and device support. Dubbed Enhanced 4.2BSD, the system runs on Digital Equipment Corp.'s VAX-11 computers and

Continued on page 38

Continued from page 37

various 32-bit microcomputers, including systems developed by Sun Microsystems, Inc. and Masscomp Co.

The company offers ongoing source maintenance and binary redistribution rights to purchasers of its Enhanced 4.2BSD source software.

The price of the Enhanced 4.2BSD system is $10,000.

Mt Xinu, 739 Allston Way, Berkeley, Calif. 94710.

PRECISION VISUALS, INC.
HP 7550 device driver

Precision Visuals, Inc. has announced a device driver coded in Fortran that permits users of the device-independent Precision Visuals DI-3000 and GK-2000 graphics tools packages to utilize the Hewlett-Packard Co. HP 7550 plotter.

Capabilities supported by the driver include 40 character fonts, nine markers, 14 line styles and the plotter's automatic paper load feature. To access the hardware functions of the HP 7550, the driver converts all DI-3000 or GK-2000 subroutine calls into the appropriate HP graphics language commands.

The HP 7550 device driver is priced at $500 and includes documentation and source code.

Precision Visuals, 6260 Lookout Road, Boulder, Colo. 80301.

STAFF COMPUTER TECHNOLOGY CORP.
The Key

Staff Computer Technology Corp. has introduced The Key, an access control and software security system that reportedly operates on any computer equipped with an RS-232 interface.

The Key achieves access control by using different inquiry/response pairs each time a terminal user requests access. The mainframe contains the master key, and each terminal requiring controlled access contains unit keys.

Software suppliers attain security by tailoring demonstration software to a specific key. The Key can be installed on any machine the demonstration works on. Users can copy the diskette and back it up, but the software and copies cannot be used without The Key.

An evaluation unit for access control includes master and unit keys and is priced at $399.

Staff Computer Technology, Suite J, 10457 Roselle St., San Diego, Calif. 92121.

DIGITAL INFORMATION SYSTEMS CORP.
DBL Version 4 on Unix

Digital Information Systems Corp. has announced that its DBL language now runs under AT&T's Unix operating system.

According to the company, Version 4 of DBL offers the ability to chain to non-DBL programs and to interface to subroutines written in other languages. Multikey IBM Isam files, full screen programming functions, a fixed-point decimal data type and a symbolic debugger are included with the system.

DBL Version 4 pricing starts at $449 for micros and ranges up to $3,549 for superminis.

Digital Information Systems, Suite 340, 3336 Bradshaw Road, Sacramento, Calif. 95827.

FOCUS from page 33

the System/34. Before moving actual production data onto the Personal Computer XT, he ran reports from both machines using test data on the Personal Computer XT and compared the results.

Coursey has done no formal testing of the application. "Most of the data we use is pretty straightforward," he said. "If there's an inconsistency, it really jumps out at you."

Admitting that he has no experience in formal development, Coursey said he basically used the prototyping capabilities of PC/Focus to make changes as he went along. "I have an idea of the ultimate goal, and I work toward it," he said. "The program logic and code probably could be better, but it does what I want."

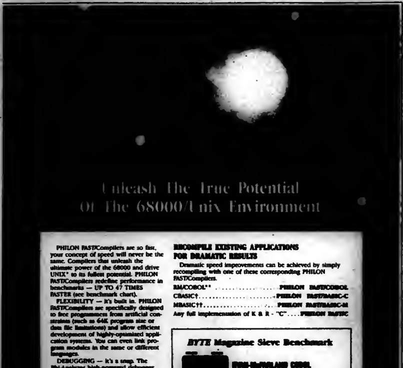
Accommodating changes

A relational data base structure was particularly helpful in accommodating frequent changes, he said. "One of the advantages of the relational data base is that I've made a lot of screwups in designing this," he said. "I've left out fields, and the relational data base has let me rebuild them easily. It grows with you."

The application is almost entirely menu-driven. "The user has no interface directly with PC/Focus," he said. He noted that he has not written any documentation for the program. "The documentation basically consists of turning the machine on," he said. While that does not present a problem as long as he works at Clyde Petroleum, Coursey admitted that "If I were to leave, and modifications needed to be made, it could be a problem. We would need a DP-type to take up where I left off."

Coursey chose PC/Focus from a list of four or five alternatives, including Ashton-Tate's Dbase II and Micro Data Base Systems, Inc.'s MDBS. "There are a lot of data bases, but I don't think [there are] any with as many bells and whistles as PC/Focus," he said. In addition, the product offered upward compatibility with mainframe Focus. "If the company grows by leaps and bounds and we have to transfer the application to the mainframe, we can do it," he said.

Coursey said PC/Focus was "difficult to learn from an end-user standpoint. It will do most of what I want [it] to do, but there are a lot of intermediate steps you have to take in order to make a program operate properly," he said.



COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

T1 users may elude 'leaky' PBX charge

Users of digital T1 communications facilities may be sidestepping the $25 surcharge now being levied on private-line facilities by local telephone companies.

This surcharge went into effect last month and is meant to compensate local telephone companies for the so-called "leaky" private branch exchange (PBX) problem. A PBX is considered to be leaky when it is tied to a remote PBX or telephone company central office with a leased line, circumventing local dial-up circuits and their associated customer access line charge.

The $25 surcharge is being applied to all private lines unless the user can prove that the circuit qualifies for exemption. Exemption is granted for circuits that are terminated by devices that are incapable of rerouting traffic into the telephone network. Generally, this means that point-to-point leased facilities that are used in data applications will not carry a surcharge, whereas the same line used to tie together remote PBXs will be subject to the charge.

While it is a relatively easy matter for telephone companies to verify circuits that should carry the surcharge, it will be more difficult for the local exchange carriers to police T1 carrier use. These digital facilities operate at 1.54M bit/sec and can be subdivided into a number of individual subchannels, typically 24 channels operating at 64K bit/sec.

Because the link is digital, data and digitized voice can be accommodated with equal ease. The data circuits, however, won't normally be subject to the $25 surcharge, and the voice circuits will, creating a potentially unmanageable situation. As one user quipped at a recent conference while discussing the digitized voice channels on a T1 link, "those aren't voice channels, they're 64K bit/sec data channels."

With the onus on the user to apply for surcharge exemption, most companies are

See CIRCUIT page 42

Interface extends boundaries of insurer's electronic mail

FORT WAYNE, Ind. — Electronic mail users at an insurance company here are now able to send messages outside of the company using an interface that is modeled after a developing standard.

Lincoln National Corp. tailored the interface for its private electronic mail network after MCI Mail Link, a specification developed by MCI Digital Information Services Corp. The insurance company has been using the interface specification — which was officially unveiled this month — since June, according to James Tunis, telecommunications director. Licensing rights for the interface will become commercially available on a license basis in April.

Without the interface it's technically possible for users to communicate with the outside world through MCI Mail. But setting up and terminating the call is cumbersome.

The specification is a forerunner of an electronic message network interface standard, known as X.400, now under development.

"It will be at least a couple of years, however, before the final version of X.400 is implemented by vendors of electronic mail systems," explained Bob Harcharik, president of the MCI Communications Corp. subsidiary. The Mail Link specification, he added, provides a way for private networks to communicate with each other during the interim.

Lincoln National is one of two beta test sites for the MCI Mail Link specification. The other is Citibank, N.A., in New York. In each case, the interface connects in-house users with MCI Mail, the international public electronic mail network operated by Harcharik's organization. MCI Mail, in turn, provides access to other private and public message networks, to TWX/telex terminals and to laser-driven printers that output hard-copy messages for delivery to those without terminals.

Without the new interface, explains Tunis, it's technically possible for users to communicate with the outside world through MCI Mail. But setting up and terminating the call is cumbersome, requiring special logon and logoff procedures. Also, the user generally is unable to get an acknowledgement that his message was received.

See MAIL page 42

International Zapmail agreement awaiting FCC stamp of approval

MEMPHIS — Fedex International Transmission Corp., a subsidiary of Federal Express Corp., has applied to the Federal Communications Commission for authority to provide international document transmission between the U.S. and Belgium and the U.S. and England.

A company spokesman said the applications include agreements with the communications governing bodies in Belgium and England to extend Federal Express' Zapmail service into those countries beginning in the spring of 1985.

The spokesman said that because of the time zone differences between the two continents, the international service would be a next-day service from the U.S. to Europe and a same-day service from Europe to the U.S., rather than the two-hour delivery that Zapmail promises for domestic document transmissions.

■ Computime, Inc. has announced a data collection and software product for use on IBM mainframes serving retail point-of-sale and banking terminals/40

■ Micom Data Systems, Inc. has announced a 14.4K bit/sec full-duplex, leased-line modem capable of accelerating to 16.8K bit/sec/40

■ Satellite Broadcast Network, Inc. has announced a satellite service for personal computer users/41

INSIDE

AT&T to launch 21,000-mile cable project

BASKING RIDGE, N.J. — AT&T Communications recently announced plans to construct a lightwave communications backbone to interconnect most major U.S. cities and to traverse the Atlantic and Pacific oceans by 1990. In addition, the company said, it plans to expand its digital microwave radio network and convert 4,500 miles of its coaxial network to digital transmission.

A company spokesman said the project to add 21,000 miles of fiber-optic cable is made possible by the improved cost-effectiveness of the technology. He noted that while fiber-optic regenerators were once necessary every few miles, they can now be spaced 24 miles apart.

"AT&T will construct the world's largest fiber-optic telecommunications network by the end of this decade," said Robert W. Kleinert, president and chief operating officer of AT&T Communications.

AT&T said it will use single-mode lightwave systems on all new routes, and that by 1988 the systems will operate at 1.7G bit/sec and transmit up to 169,344 simultaneous conversations.

The lightwave systems will provide voice, data and video transmission between AT&T digital switching machines in major cities. The company already has lightwave systems connecting Boston to Washington, D.C. and San Francisco to Bakersfield, Calif. Other cities will be added to the network in phases through 1988.

The company said that by 1988 it will have installed the majority of the first transoceanic lightwave system. This project, known as the TAT-8 system, will link Tuckerton, N.J. with Widemouth, England, and Penmarch, France. AT&T said it plans to connect California with the western Pacific via Hawaii and Guam by late 1988 or early 1989.

Satellite net to relay financial information

NEW YORK — E.F. Hutton & Co. and Equatorial Communications Co. have announced an agreement for a private satellite-based communications network to be used to transmit customer account information and real-time securities information among 400 E.F. Hutton offices in the U.S.

The system, utilizing a 9.6K bit/sec satellite channel, will also allow E.F. Hutton to download software on a point-to-multipoint basis to its offices, which will be equipped with Data General Corp. MV4000 minicomputers.

Equatorial will supply the earth stations and services for the hybrid satellite/terrestrial net.

E.F. Hutton is located at 1 Battery Park Plaza, New York, N.Y. 10004; and Equatorial Communications is at 300 Ferguson Drive, Mountain View, Calif. 94040.

VOICE/DATA COMMUNICATIONS

MANUFACTURING TECHNOLOGIES, INC.

Matchmaker 2000

Manufacturing Technologies, Inc. has introduced a link enabling IBM 3270 terminal users to access non-IBM hosts, local-area networks and public data networks.

Matchmaker 2000 is said to allow users to toggle back and forth between IBM and non-IBM sessions. It reportedly allows access to minicomputers and mainframes such as those from Digital Equipment Corp., Data General Corp. and Hewlett-Packard Co. and a variety of micros, private branch exchanges, public packet-switching networks, information services and electronic mail services.

The product is installed between the user's IBM 3178, 3179, 3180, 3278 or 3279 terminal and the IBM 3274 or 3276 cluster controller. The Ascii device can be connected directly with an RS-232C interface or through a modem, according to the vendor. It reportedly supports either 7- or 8-bit Ascii character modes at speeds up to 19.2K bit/sec.

It is based on an Intel Corp. control microprocessor with structured control programs and table-driven software for interface flexibility, according to Manufacturing Technologies.

Matchmaker 2000 costs $695.

Manufacturing Technologies, 6481 Global Drive, Cypress, Calif. 90630.

PROTOCOL CONVERTERS

THOMAS ENGINEERING CO.

Protocol Control Unit

Thomas Engineering Co. has announced an enhanced model of its MZ-80 MIU protocol converter.

The Protocol Control Unit reportedly gives asynchronous terminals access to IBM Bisynchronous and Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) nets, Honeywell, Inc. Visual Information Projection (VIP) nets and X.25 packet-switched nets.

It was designed to give a terminal access to all four environments and is said to support up to 50 asynchronous terminals and four hosts. The basic unit supports eight terminals.

The unit has a facility for file transfer, modem and printer sharing and access to dial-up modems and serial devices such as cash registers and energy management controllers, according to the vendor. The modular units with bisynchronous and VIP support will be available in January 1985, the SNA/SDLC support in the second quarter of 1985 and the X.25 support in the third quarter of 1985.

Prices start at $5,995 for the eight I/O port model. Host ports cost $750 each, except for SNA/SDLC, which costs $1,100.

Thomas Engineering, 2440 Stanwell Drive, Concord, Calif. 94520.

SOFTWARE

COMPUTIME, INC.

Communications software package

Computime, Inc. has announced a data collection and communications software product for use on IBM mainframes serving intelligent terminals such as retail point-of-sale and banking terminals.

The software, which is unnamed, is said to provide off-line polling of terminals to collect data for batch processing and to provide downloading of price changes and other information to the terminals.

The number of lines served is limited only by the host's physical limits. The product's modular design reportedly allows access to varied communications devices and use of various standard protocols.

It runs on IBM 4300 series, 370 series and 30 series mainframes under DOS/VSE and OS/MVS.

The basic version costs $65,000; additional modules that provide extra protocols and access to additional devices cost about $25,000 each.

Computime, 401 N. 117th St., Omaha, Neb. 68154.

MULTIPLEXERS/ MODEMS

ASTROCOM CORP.

SH56S

Astrocom Corp. has introduced its SH56S modem, designed to transmit synchronous data at 28K bit/sec or 56K bit/sec over twisted-pair lines.

At the lower speed, the SH56S is said to be effective over distances up to 3 miles and 2¼ miles at 56K bit/sec. It reportedly can be configured for point-to-point or multipoint operation, is available in a stand-alone or nested circuit card design, has switch-selectable speeds and features an optional V.25 interface.

With an RS-232 interface, the stand-alone costs $730, and the circuit card costs $540. With the V.25 interface, it costs $822 as a stand-alone and $632 as a circuit card.

Astrocom, 120 W. Plato Blvd., St. Paul, Minn. 55101.

MICOM SYSTEMS, INC.

Micro4000 Data Modem Model 40144

Micom Systems, Inc. has announced what it said is its fastest full-duplex, leased-line modem.

The Micro4000 Data Modem Model 40144 normally operates at 14.4K bit/sec, but is said to accelerate to 16.8K bit/sec in the absence of line noise.

This capability reportedly increases throughput, particularly on

links supporting multiplexers or remote job-entry stations. The increase from 14.4K bit/sec to 16.8K bit/sec is automatic under optimal line conditions, and the speed can fall back automatically to 12K bit/sec or 9.6K bit/sec if line quality deteriorates below AT&T D1 conditioning standards. The modem costs $6,495.

Micom Systems, 20151 Nordhoff St., Chatsworth, Calif. 91311.

U.S. ROBOTICS, INC.
Modems and software

Modem manufacturer U.S. Robotics, Inc. has introduced two 2,400 bit/sec modems, the stand-alone Courier 2400 and integral Microlink 2400 for use in the IBM Personal Computer and compatibles.

The units reportedly provide dial-up, asynchronous communications and feature autodial and autoanswer, CCITT V.22 compatibility at 2,400 bit/sec, and compatibility with AT&T 212A at 1,200 bit/sec and AT&T 103 at 300 bit/sec.

Other features include call duration reporting, display of current settings for communications parameters and other operational controls, Help screens, repeat command, quote mode and call progress detection.

Each modem costs $895.

The company also announced Telpac 3.0, an enhanced version of its telecommunications package for the IBM Personal Computer and compatibles designed to work with U.S. Robotics and compatible modems. The package features windows to guide users through commands and costs $99.

U.S. Robotics, 1123 W. Washington Blvd., Chicago, Ill. 60607.

NETWORK SERVICES

SATELLITE BROADCAST NETWORK, INC.
Satellite receiver system

Satellite Broadcast Network, Inc. has announced a satellite service for personal computer users.

Users can purchase a 12-GHz compact satellite receive-only antenna, an amplifier, a solid-state receiver and a demodulator to access the service, which is available to users of the IBM Personal Computer and compatibles.

The company said that services will include financial data, news, weather, sports, software downloading and specialized information such as agricultural, scientific and medical data. The information services will be provided by various vendors.

The hardware for the 9.6K bit/sec service costs $960.

Satellite Broadcast Network, 30 E. Huron, Chicago, Ill. 60611.

AUXILIARY EQUIPMENT

LIGHTWAVE COMMUNICATIONS, INC.
FO-232E

Lightwave Communications, Inc. has announced the third product in its series of RS-232C fiber-optic data links.

The FO-232E was designed to transmit data asynchronously via plastic cable at distances up to 250 feet. It is intended to enable end users to interconnect terminals, printers and other peripherals to computer equipment at speeds up to 19.2K bit/sec and is compatible with existing RS-232C 25-pin connectors, according to the company.

It costs $90.

Lightwave Communications, 650 Danbury Road, Ridgefield, Conn. 06877.

KURZWEIL COMPUTER PRODUCTS, INC.
Penta Custom Interface

Kurzweil Computer Products, Inc. has announced a custom interface that is said to link its Kurzweil 4000 Intelligent Scanning systems and Penta Systems International, Inc.'s typesetting systems.

The Penta Custom Interface is said to insert Penta-specified composition commands automatically into the scanned text during the communications process from the Kurzweil 4000 to a Penta front-end system. It was designed to eliminate the need for inserting additional typesetting commands prior to phototypesetting.

Available now on 8-in. floppy disks, it costs $5,500.

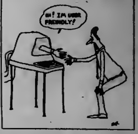
Kurzweil Computer Products, 185 Albany St., Cambridge, Mass. 02139.

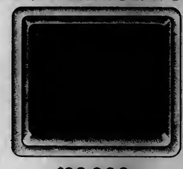
DIGITAL EQUIPMENT CORP.
DHU11; DMZ32

Digital Equipment Corp. has introduced two asynchronous multiplexers to connect serial lines to DEC Unibus-based VAX-11 and PDP-11 computers.

According to the vendor, the DHU11 interfaces up to 16 asynchronous lines between any PDP-11 or VAX-11 computers with an integral Unibus operating under DEC VAX/VMS Version 4.0. The single hex-size circuit card is said to support medium- and high-speed serial communications requirements, connecting through RS-232C or RS-432A interfaces. It features direct

Continued on page 42





Continued from page 41

memory access (DMA) and first-in-first-out (Fifo) operations to minimize CPU overhead, according to DEC.

The DMZ32 multiplexer supports up to 24 asynchronous lines to Unibus-based VAX-11 computers. The vendor said the DMZ32 is a high-performance unit that can interface a variety of terminals to a VAX-11 system, allowing a terminal distribution panel to be located up to 5,000 feet from the Unibus connection. It also features RS-232C connectors and DMA and Fifo operation.

Both controllers provide half- or full-duplex communications, according to DEC.

The price of the DHU11 begins at $3,120, and the price of the DMZ32 begins at $3,215.

DEC, Maynard, Mass. 01754.

DIGITAL PRODUCTS, INC.
Digital Current Loop Switches

Digital Products, Inc. has announced a series of switches that allow Teletype and compatible equipment to communicate with any RS-232 device.

Digital Current Loop Switches reportedly allow Teletypes, early Digital Equipment Corp. equipment such as PDP-11 computers and LA 120 terminals, high-speed printing terminals and CRTs to be combined with computers and modems in a common system.

They are said to accommodate up to 9,600 bit/sec transmissions and to allow grouping to connect an unlimited number of devices.

They are priced from $395.

Digital Products, 600 Pleasant St., Watertown, Mass. 02172.

ALCYON CORP.
I/O processor

Alcyon Corp. has announced an intelligent I/O processor designed for Motorola, Inc. 68000 and AT&T Unix-based systems.

Each of the 16 full-duplex asynchronous serial data channels of the device can support data bursts up to 9.6K bit/sec from a 68000 processor. Synchronous data rates up to 1.5M bit/sec are possible on each of two programmable, on-board full-duplex channels. It includes a four-channel direct-memory access controller and buffer memory and occupies a dual-width Digital Equipment Corp. Q-bus circuit board. It costs $2,345. An eight-channel option costs $950 and a 16-channel multiplexer is $1,555.

Alcyon, 8716 Production Ave., San Diego, Calif. 92121.

MAIL from page 39

"Our new interface eliminates these problems. It establishes and terminates the connection automatically between our network and the MCI Mail network. Their system then takes care of the other end. And we get an acknowledgement — when the message is received by the MCI Mail network as well as when it's delivered in hard-copy form to the recipient," Tunis said.

The interface also permits a delivery confirmation to be returned to the sender from any terminal connected to the MCI Mail network.

Tunis said it is still too early to detect a change in the outside message traffic flowing through Lincoln National's in-house network, largely because the company hasn't made a special effort to tell users about the interface.

The present version is being upgraded to conform with the version MCI announced this week. Tunis expects the upgrade to become operational within a few months. He believes that during the succeeding year or two, outside message traffic sent and delivered through the company's electronic mail network will increase gradually.

A prospective added benefit, Tunis said, is the ability to correspond with clients and suppliers on-line. Lincoln National communicates regularly, for example, with reinsurance companies that broker the company's policies and with organizations that have purchased group insurance coverage. Now, the postal service carries this correspondence.

A systems analyst and a programmer needed about two man-months to develop the present interface, Tunis said, and he estimates that implementing the upgrade will require approximately one more month. The only other cost — amounting to about $600 — was for an error-checking modem to connect Lincoln National's in-house network with the MCI Mail network.

CIRCUIT from page 39

expected to be upright about T1 use, but a spokesman for the Federal Communications Commission admitted that there will be "definite problems" monitoring its use.

These problems will be exacerbated as T1 use becomes more prevalent. The appeal is usually a simple, economic one. As an example, a user that wished to remain anonymous reported that he is saving more than $5,000/mo by replacing individual leased lines with a single T1 facility.

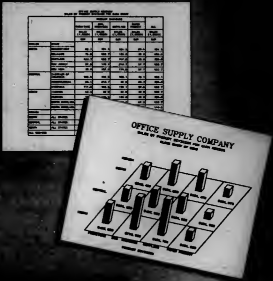
He replaced 20 tie lines connecting two PBXs and 11 individual 9.6K bit/sec leased lines for data communications with the T1 link. With a T1 multiplexer, the 1.54M bit/sec bandwidth of the T1 facility was divided into 20 32K bit/sec voice tie lines, one 19.2K bit/sec data channel, 10 9.6K bit/sec synchronous channels and four 9.6K bit/sec asychronous channels. Additionally, the user reported there is approximately 700K bit/sec of spare capacity on the link.

Before the T1 was cut over, the total cost of this user's voice and data lines, plus the necessary modem and multiplexing hardware, was nearly $9,500/mo. With the T1 link and the necessary multiplexing hardware his monthly bills dropped to roughly $3,800/mo.

Discover the SAS System
Your Report Writing Solution

OFFICE SUPPLY COMPANY

OFFICE SUPPLY COMPANY



OFFICE SUPPLY COMPANY

[illegible]

INTRODUCING THE STANDARD BY WHICH EVERY OTHER PC WILL BE MEASURED:

THE DATA GENERAL/One™ PORTABLE.

Fits in a briefcase.

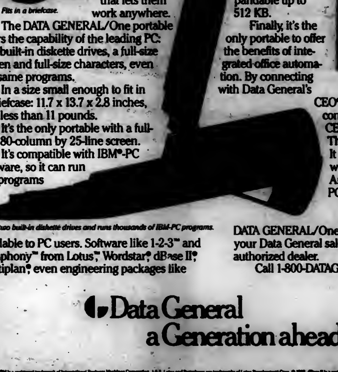
Free your people from the confinement of their deskbound computers, with the first full-function business system that lets them work anywhere.

The DATA GENERAL/One portable offers the capability of the leading PC: two built-in diskette drives, a full-size screen and full-size characters, even the same programs.

In a size small enough to fit in a briefcase: 11.7 x 13.7 x 2.8 inches, and less than 11 pounds.

It's the only portable with a full-size 80-column by 25-line screen.

It's compatible with IBM®-PC software, so it can run the programs available to PC users. Software like 1-2-3™ and Symphony™ from Lotus™, Wordstar®, dBase II®, Multiplan®, even engineering packages like Golden Common LISP™ and Bellesoft ES/P™-Ada®.



It has two built-in diskette drives and runs thousands of IBM-PC programs.

It's the only portable with two built-in 720 KB diskette drives, giving it twice the storage capacity of the leading PC. And memory is expandable up to 512 KB.

Finally, it's the only portable to offer the benefits of integrated office automation. By connecting with Data General's CEO® system, users can convert MS™-DOS files to CEO files and vice versa.

Connects with Data General's CEO office automation system.

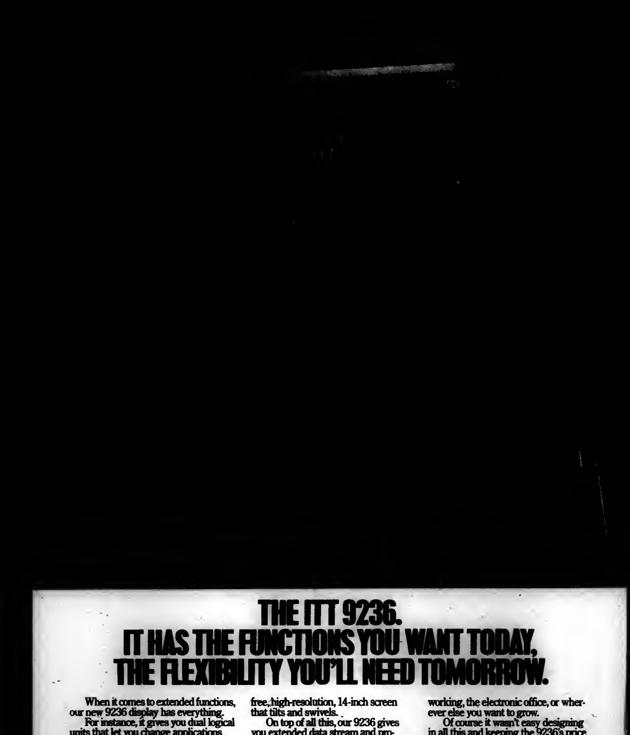
The DATA GENERAL/One. It gives your people what the leading PC does. And something the leading PC doesn't.

Their freedom.

Find out more about the DATA GENERAL/One portable by contacting your Data General salesperson or nearest authorized dealer.

Call 1-800-DATAGEN.

Data General
a Generation ahead.



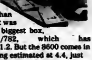
SYSTEMS & PERIPHERALS

HARD TALK
John Desmond
CW Staff

Can DEC software offerings live up to 8600's promise?

By announcing its most powerful CPU, the VAX 8600, Digital Equipment Corp. has caught up in hardware technology to competing supermini vendors Prime Computer, Inc. and Data General Corp. and even positioned itself well against small IBM mainframes in price/performance terms.

But several analysts interviewed by *Computerworld* question whether DEC's software can equal the power of its hardware.



Prime's 9950 and DG's MV/10000 high-end machines, each boasting performance ratings of 2.5 million instructions per second (Mips) [CW, Aug. 20] are more powerful than the machine that was formerly DEC's biggest box, the VAX-11/782, which has a Mips rating of 1.2. But the 8600 comes in with a Mips rating estimated at 4.4, just below IBM's recently announced 4381 Model Group 3.

"DEC has regained the leadership position it needed to maintain credibility in the industry," said Hank Janson of International Data Corp. (IDC), a market research and consulting firm based in Framingham, Mass. IDC analyst Dave Moschella said, "This system allows DEC to meet the demands of customers who may have been attracted to IBM," at a price considerably less than comparable IBM mainframes.

Frederic Withington, vice-president of information systems for Arthur D. Little, Inc. of Cambridge, Mass., said, "The 8600 makes a major change in DEC's competitive position. There is an outside chance DEC may get into [the manufacturing] machine rooms of large companies that are now primarily IBM." But, he qualified, "The 8600 hardware is good for this, but I'm not sure the software is powerful enough. The big, heavy-duty system programs like CICS I'm not sure DEC can match. Without them, DEC can't play."

Stephen Smith, security analyst with Paine Webber, Inc., does not believe the 8600 will allow penetration of IBM's market so much as it will make DEC more attractive to new users and existing users who may have been contemplating switching to IBM for more power. "I think the top-cover is significant," Smith said. "In the past, when the end user felt he needed a bigger machine, the only way to go was IBM because DEC offered less than 2 Mips. Now, [DEC] can offer their customers a greater range of performance. So I do think it helps their position in relation to IBM, but I don't think it's an attack on the IBM data center."

Like Withington, Smith said, "The real issue is software development." Smith likes version 4.0 of VMS for its clustering

See DEC page 52

Amdahl enhances 6880

Doubles channel, memory capacity; lowers fees

SUNNYVALE, Calif. — Amdahl Corp. last week doubled the channel and cache memory capacity of its 6880 disk control unit. At the same time, Amdahl cut the purchase price of the cache memory feature by as much as 52%. The company also lowered maintenance charges on all models of the 6880 by 20% to 25%.

The cache controller feature is used to boost CPU performance by storing frequently used data in cache memory, the company said. The 6880 is now available with 8M-, 16M-, 24M- or 32M bytes of cache memory. Previously, the maximum cache capacity was 16M bytes. A spokeswoman said the expanded memory will be accomplished with 256K-bit memory chips.

The 6880 can now support up to 16 channels, twice the previously available capacity. The spokeswoman noted that Amdahl has also added to the 6880 support for IBM's VM operating system using IBM's High Performance Option.

Purchase prices for the 6880 range from $119,970 to $315,480, depending on the memory configuration. Corresponding maintenance charges now range from $684/mo to $1,004/mo, according to the firm.

A sample configuration consisting of a 6880 G2 controller with 16M bytes of cache memory, one Amdahl 6380 AA4 string controller and three 6380 B4 disk drives costs $294,600. The same configuration used to cost $427,500; a spokeswoman noted that the lower price also reflects an earlier price cut on disk drives. Maintenance on the configuration costs $1,730/mo; the old maintenance price was $2,280/mo.

As an example of the cost of cache memory field upgrades, Amdahl said a user of a 6880 with a 16M-byte cache controller feature would have to pay $40,000 to upgrade the unit to accommodate 24M bytes of cache memory. Likewise, it would cost $80,000 to upgrade a 6880 with a 16M-byte cache controller feature to a 32M-byte configuration.

Amdahl is located at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

■ NCR Corp. has released the 9100/System hardware and software for retail stores/48

■ Redshaw, Inc. has announced the Series/2 automation system for insurance agencies, using Wang Laboratories, Inc. CPUs/48

INSIDE

Honeywell announces mini-based hospital record management tool

MINNEAPOLIS — Honeywell, Inc. has announced a medical record management system for hospitals, the Transcription Recording and Chart Tracking System (Tracts), running on the company's DPS 6 line of minicomputers.

The system runs under the company's Gcos 6 MOD 400 software.

The system's medical record software is said to automate transcription, record analysis, record tracking, abstract production and report generation. The company's office automation software includes word/document processing, records processing, calendar and calculator facilities. DP options for Tracts include data base management systems, transaction processing packages and high-level language support. Communications software is available to support the exchange of data between Tracts and hospital billing, statistical and admissions computers, the company said.

The price of a 250-bed hospital configuration including DPS 6/45, four workstations, a printer, 1M byte of memory and two 20M-byte disk drives is $62,000.

More information is available from Honeywell, Honeywell Plaza, Minneapolis, Minn. 55408.

Sytek releases PFX micro security system

MOUNTAIN VIEW, Calif. — Sytek, Inc.'s Data Security Division recently announced the PFX identity authentication system, a security system that uses an automated one-time password technology said to prevent unauthorized access to networked personal computers or multiuser systems.

Sytek said the PFX system includes a Passport, a portable, hand-held device with an LCD that is programmed for each individual user, and an Authentication Server, a Convergent Technologies, Inc. microcomputer that attaches to the host computer or network.

Under the PFX system, users enter a unique numerical password each time they wish to access the system, the firm said. In order to gain entry, the user must have a Passport, a personal identification number (PIN) and an Authentication Server and must respond correctly to a series of prompts.

'Challenge number'

When a user logs on to the system, the Authentication Server issues a seven-digit "challenge number," which appears on the user's computer screen, according to the company. The user enters his own PIN into the Passport and then enters the challenge number as well.

A one-time password (another seven-digit number) appears on the LCD on his Passport. To gain access to the system, the user then types the password into the terminal.

According to the company, the password sequence generated by each Passport is unique: Given the same challenge number, no two Passports will generate the same response.

In addition, no individual Passport responding to the Authentication Server's challenge will give the same response twice, the company said. An individual Passport is said to work only with the PIN for which it has been programmed, the firm said.

A single Authentication Server is said to be able to serve one or two host computers and up to 2,000 users. The PFX system, said to be compatible with most computer equipment, links to systems through one or more RS-232 serial ports.

The Passport is said to give users access from any terminal. According to the company, the device is virtually tamperproof because its microprocessor will erase itself if the device is taken apart.

The system's Authentication Server is said to

See SYTEK page 54

TURNKEY SYSTEMS

REDSHAW, INC.
Series/2

Redshaw, Inc. has announced the Series/2 automation system for insurance agencies, using a version of the Wang Laboratories, Inc. 2200 MVS CPU with 600-nsec processing speed and support for up to 240 Wang 2236 workstations or Professional Computers.

Storage capacity of the Series/2 exceeds 320M bytes or 250,000 policy files, the company said. Financial analysis, policy file management, word processing and a variety of personal computer software is available, including IBM Personal Computer-compatible types. The Redshaw P-400 printer, said to print over 400 line/min of letter-quality type, is also provided with the system.

The price for a system with the Wang 2200 and eight workstations is about $88,000, the vendor said.

Redshaw, 103 Yost Blvd., Pittsburgh, Pa. 15221.

DATA STORAGE

METHEUS-COMPUTERVISION, INC.
MS200 mass storage system

Metheus-Computervision, Inc. has released a mass storage system that provides up to 840M bytes of additional storage space formatted for Metheus-Computervision Design Systems. The MS200 has an average access time of 18 msec and a data transfer rate of 1.86M byte/sec.

The system offers a choice of either one or two 420M-byte Winchester disk drives or one Winchester drive and one Cipher Data Products, Inc. magnetic tape drive. It is fully field-upgradable, according to the vendor.

The price of the MS200 is $27,500 with one 420M-byte disk drive, and with the addition of one Cipher tape drive, it costs $35,500, the vendor said.

Metheus-Computervision, P.O. Box 959, Hillsboro, Ore. 97123.

MICRO TECHNOLOGY, INC.
MD4000 series subsystems

Micro Technology, Inc. has introduced three products in its new MD4000 series of subsystems. The products are designed for use with Digital Equipment Corp.'s LSI-11, LSI-11/2, LSI-11/23 and LSI-11/73 computers running under DEC's RT-11 and RSX-11M operating systems and using S&H Computer Systems, Inc.'s TSX-Plus time-sharing software.

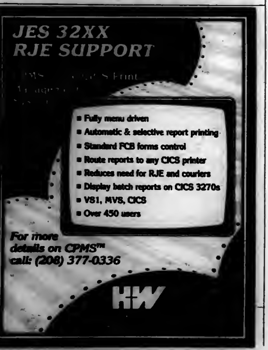
The MD4260 consists of a 40M-byte fixed Winchester drive and a 60M-byte streaming cartridge tape and is designed for speed and reliability on backup capability, the vendor said.

The MD4910 is a 5¼-in. form factor removable Winchester subsystem. It consists of dual 10M-byte removable cartridges and is said to lend itself to sensitive or classified applications.

The MD4110 consists of a 40M-byte fixed Winchester drive and a 10M-byte removable media Winchester device and lends itself to on-site backup, software upgrades and installation of new software, according to the vendor.

The price of the MD4260 is $7,156, the MD4910 is $5,679, and the MD4110 is $6,370.

Micro Technology, 1620 Miraloma Ave., Placentia, Calif. 92670.



NCR offers 9100/System, POS units for retail use

DAYTON, Ohio — NCR Corp. has announced the 9100/System hardware and software for general merchandise retail operations and two point-of-sale terminals for the specialty store marketplace.

The 9100/System is said to use very large-scale integration technology and communications technology that allows files resident at local sites to be accessed by remote central computers. The architecture provides on-line transaction processing, automatic price lookup, efficient inventory control and automatic credit authorization.

The system uses the company's standard computer system interface, an Ansi standard peripheral interface protocol. The 9100 features up to 1M byte of memory, a 5¼-in. flexible disk, two 5¼-in. Winchester disk drives, up to 37M bytes of storage and the standard computer system interface controller. The desk unit measures 10-in. wide by 27-in. deep by 29-in. high.

The 9100/System uses IBM's Systems Network Architecture for data communications. The company's Tcos operating system is intended for maximum efficiency in a distributed transaction processing environment.

Tcos has a series of subsystems, including a Cobol interface, a function scheduler and a file management system.

The price of the 9100/System hardware is $23,000, and the price of the software is $8,000, the company said.

The 2155 terminal can function as a stand-alone or primary terminal controlling 2154 satellite terminals in a cluster. The 2154 is intended to function as a secondary terminal. Both terminals are programmable in Basic, the company said.

The 2155 and 2154 terminals in a cluster environment operate on a shared resource basis. The 2155 has a programmable 50-key, point-of-sale function keyboard, 170 line/min printer, cash drawer and operator display, the vendor said. A 5¼-in. floppy disk drive, expandable to dual flexible disk drives, is included with the terminals. Standard memory is 128K bytes, expandable to 256K bytes.

Three communications adapters available include asynchronous, common carrier Data Link Control and common carrier bisynchronous for communicating with the host processor. The price of the 2154 is $3,310, and prices for the 2155 start at $4,405, according to the vendor.

Additional information is available from NCR, which is located at 1700 S. Patterson Blvd., Dayton, Ohio 45479.

Q. CAN A CABLING SYSTEM [illegible]

A. With all the various devices a [illegible] uses to process, move and store [illegible], it's easy [illegible] one important [illegible] together. That's where [illegible] in. But are you just [illegible] Here are some [illegible] understand the role [illegible] cabling [illegible] solving your communications problems [illegible] your [illegible] tomorrow.

Q. First of all, just what is a cabling system?

A. A cabling system is designed on a "wire-once" concept. Just as electrical wires are run in buildings today, a cabling system is a permanently installed set of wires that connects the computers, terminals, workstations, telephones and PBXs within a large office building or a campus. This cabling system should also be the foundation for local area networks of the future.

Q. Aren't my computers and telephones already hooked up to a cabling system?

A. It's not so much a cabling system as it is a bunch of cables. Look above the drop ceilings in most office buildings, and you'll discover miles and miles of all kinds of cable. And much of it, strangely enough, is unused. The reason for this waste is that few devices (i.e., telephone, terminal, personal computer, etc.) use the same type of cable. Consequently, when a new device is installed or when one is moved from one office to another, it's quicker, easier and cheaper to run a new cable than it is to remove and reroute the old cable.

This is not to suggest, however, that running a new cable is quick, easy or inexpensive. Relocating just one terminal can cost as much as $1,500. Not to mention a week or two of downtime while the wiring gets done. And when you think about how often office workers move from one workplace to another, you can see that we're talking about a considerable expense.

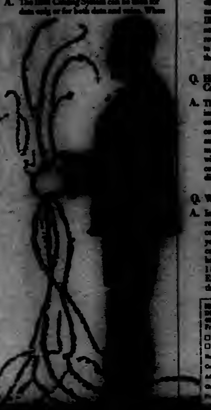
Q. How can a cabling system help solve my wiring problem?

A. Once installed, a cabling system can make wiring for a new or relocated terminal as easy as moving a plug from one socket to another. The IBM Cabling System calls for the one-time installation of a single cable running from each workplace, inside the walls, and into a central "wiring closet." In the office, that cable terminates in a standard faceplate on the wall, not unlike an electrical outlet. In the wiring closet, the cable terminates in a patch panel that can connect it to any number of devices.

The installation of the IBM Cabling System should be considered if you're adding a number of new workstations, installing a PBX, doing a major renovation or building a new office building. In many cases the "wire-once" benefit will cost-justify the IBM Cabling System in five years.

Q. How do the telephone and the IBM Cabling System work together?

A. The IBM Cabling System can be used for data only or for both data and voice. When [illegible] and [illegible] manufacturers have tested [illegible] telephones with the IBM [illegible]. They report that the voice [illegible] support their PBX features and transmission speeds.



Q. How can the IBM Cabling System help me today?

A. Currently being installed in office buildings, the IBM Cabling System can connect most of the available IBM data devices, such as personal computers and workstations, small and intermediate computers. We expect that it will also connect many devices made by other manufacturers.

Q. How will the Cabling System help answer my telecommunications needs of the future?

A. The quality and reliability of the IBM Cabling System enable it to transmit data at very high speeds. This makes it the ideal foundation for IBM's planned general purpose local area network (LAN). This LAN, utilizing a "token-ring" technology, can be implemented gradually to connect different workstations, departmental systems and large processors. So by investing in the IBM Cabling System today, you'll not only save money on current installation and rewiring costs, you'll also be better prepared to meet your telecommunications needs of the future.

Q. How do I go about getting the IBM Cabling System?

A. There are a number of design and installation companies that can plan your cabling system and do the actual wiring. The cable and accessories are available through authorized distributors. Your IBM marketing representative can provide you with the names of these companies. The cable and accessories can also be ordered directly from IBM.

Q. Where do I go from here?

A. Installing the IBM Cabling System today is really installing the foundation for your company's future in telecommunications. So you'll want to plan quite thoughtfully. We can help. If you'd like a free copy of the brochure, "The IBM Cabling System," call 1 800 IBM-2468, Ext. 90, or return the coupon.

IBM

IBM
DRM, Dept. 3K/90
400 Parson's Pond Drive
Franklin Lakes, NJ 07417

☐ Please have an IBM marketing representative call me.
☐ Please send me "The IBM Cabling System" brochure.

Name__________ Title__________

Company__________

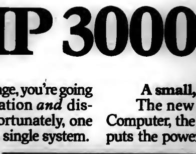
Address__________

City__________ State__________ Zip__________

The HP 3000 compu

However much you change, you're going to need both office automation *and* distributed data processing. Fortunately, one company gives you both in a single system.

Hewlett-Packard's HP 3000 is a fully compatible family of computers, ranging from a new system that handles as few as two users to a distributed mainframe that connects up to 400. You can run the same software right up the line.



And all of our systems can change and grow right along with you. Whenever you're ready for upgrades and additions, you simply plug your existing programs into the new systems. No recompiling. No time and money wasted on conversion.

A small, but mighty, addition.

The new HP 3000 Series 37 Office Computer, the latest member of the family, puts the power of the HP 3000 within the reach of smaller budgets.

So now you can afford to give your branch offices and departments their own systems. And they'll still remain part of your overall DP picture with links to other systems.

In the office, the HP 3000 is the heart of our Personal Productivity Center. This integrates the information people need to get their jobs done more productively.

It provides an interface for a wide range of workstations, peripherals and personal computers, including our Touchscreen

TERMINALS

ANN ARBOR TERMINALS, INC.
Ambassador XL; Guru XL

Ann Arbor Terminals, Inc. has introduced two vertical format 15-in. display terminals. The units were designed for word processing applications and are part of the company's XL series of Ansi standard CRT display terminals.

The Ambassador XL features a 4,800-char. memory that can be positioned on the screen in a 60-line by 80-col. format and scrolled or vertically zoomed through in other user-defined display formats ranging from 18 to 60 lines, the vendor said. This editing terminal can operate in both interactive and block modes at data rates up to 19.2K bit/sec.

The Guru XL has a 28K-byte memory that can be configured in formats of up to 66 lines by 170 columns. The off-screen memory can be partitioned into pages of text or scrolled through horizontally and vertically to accommodate large files of data, according to the vendor. Set-up modes allow for black characters on a white background and adjustment of screen brightness levels.

The keyboard used on both units is programmable with any Ascii string on up to 30 levels. Keys can be tagged for local only, send only and repeat control.

Price of the Ambassador XL is $1,595 and for the Guru XL is $2,395.

Ann Arbor Terminals, 6175 Jackson Road, Ann Arbor, Mich. 48103.

INTECOLOR CORP.
Model 8810, 3810 terminals; Series 2000 monitors

Intecolor Corp. has introduced the Model 8810 and 3810 color terminals, compatible with the company's 8001G terminal, and the Series 2000 19-in. monitors.

The Model 8810 features 32K bytes of random-access memory, three serial I/O ports and one parallel port and support for up to seven character sets of 128 characters each, according to the vendor.

The Model 3810 color terminal, a smaller version of the 8810, features a 13-in. display, tilt screen and detached keyboard and a display format of 80 lines by 48 characters, the vendor said. A rack-mounted version of the 3810, the Model 3881, is also available.

The Series 2000 monitors are intended for personal computer-based control applications and are available for Texas Instruments, Inc.'s Professional, IBM's Personal Computer and compatibles.

The Model 8810 color terminal costs $3,145; the Model 3810 costs $2,645; and the Model 3881 costs $2,995, the vendor said. The price for a Series 2000 monitor is $1,595.

Intecolor, Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

See UNITS page 54

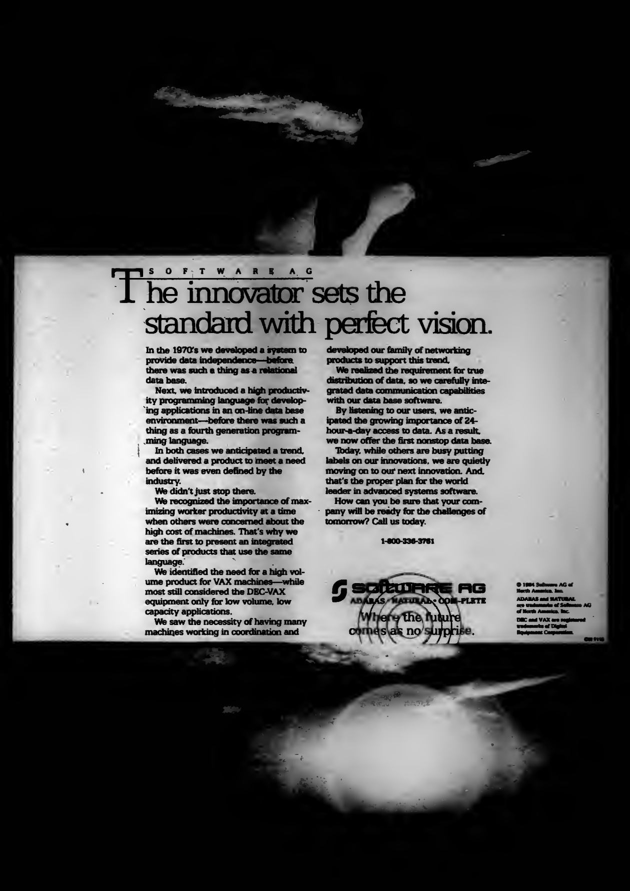
DEC from page 47

ability, distributed file management and software development features. "It's a very sophisticated operating system. It's a strong alternative to [AT&T's] Unix," he said.

Clay Prestia, vice-president of technical development for Raxco, Inc. of Rockville, Md., which provides analysis and performance aids for VAX VMS systems, characterized the 8600 as having a mainframe-like architecture that is distinguished from the VAX-11/780 supermini architecture by the 8600's separate memory-to-CPU and I/O transfer buses. "The big slowdown with the previous architecture in the 780 was the big slowdown in the memory path," Prestia said. "Anytime the I/O is happening, the CPU has to wait for the memory path to clear. That doesn't happen in the 8600."

But while DEC would like to compete with IBM with the 8600, Prestia said, "Where DEC shoots themselves in the foot . . . is [in] the efficiency of the I/O handling in their software. DEC will have a hard time making a big dent into traditional DP areas until they do something about the efficiency of the software."

The analysts agreed that the 8600 announcement puts no immediate pressure on competing supermini vendors to match performance, since the 8600 is a catch-up product. But since the biggest box is often thought to be the easiest to sell, firms like DG and Prime are likely to respond eventually.



UNITS

from page 52

ZENTEC CORP.
Zephyr DD-220

Zentec Corp. has introduced an alphanumeric terminal designed to be compatible with the Digital Equipment Corp. VT220 terminal.

The Zephyr DD-220 is said to emulate fully the VT220 and to feature a 14-in., lockable tilt-and-swivel monitor. It has a 105-key, detached, low-profile keyboard with an 18-key accounting-style pad. Fifteen of the 20 function keys are programmable, the vendor said.

Available character fonts include Ascii, the U.K. national set, DEC special graphics, multinational characters and a downloadable soft character font. The 25-line display can be 80 or 132 columns with bidirectional scrolling. Green or amber phosphor displays are available. The terminal also features blinking, bold, underline, normal or reverse video and double-high, double-wide and blank attributes on a character-by-character basis, the vendor said.

The Zephyr DD-220 costs $850.

Zentec, 2400 Walsh Ave., Santa Clara, Calif. 95050.

TERM-TRONICS, INC.
Miracle 178P

Term-Tronics, Inc. has announced the Miracle 178P, an IBM 3178-compatible terminal said to be equipped with a printer port that can be used to make an Ascii printer operate like an IBM 3287-type asynchronous printer.

The terminal features a 12-in. CRT, a 1,920-char. green phosphor screen, a tilt-and-swivel base, operator-adjustable screen contrast and brightness and an RS-232C printer port, the vendor said.

The Miracle 178P is priced at $1,145.

Term-Tronics, 7408 Trade St., San Diego, Calif. 92121.

MOTOROLA, INC.
KDT 480 Mobile Data Terminal

Motorola, Inc.'s Communications Sector has announced the KDT 480 Mobile Data Terminal, a wireless data terminal that can act as a stand-alone unit or be connected to a vehicle's radio.

The terminal can be connected to a fixed-position radio that transmits to and receives from a mobile radio, sending information back to a controller that acts as a telephone modem, the vendor said. The microprocessor-driven controller reportedly can communicate with IBM's Systems Network Architecture as well as binary synchronous and asynchronous protocols.

Features reportedly include random-access memory storage of up to 3,000 char., a text area of more than 20 sq in. and 12 lines of 40 char. in each format.

The terminal is priced at $3,295.

Motorola, Communications Sector, 1301 E. Algonquin Road, Schaumburg, Ill. 60196.

PRINTERS/PLOTTERS

GENERAL BUSINESS TECHNOLOGY, INC.
6630XP

General Business Technology, Inc. has announced the 6630XP laser printer for use with IBM's System/34, 36 and 38 processors, as well as with IBM's Personal Computer.

According to the vendor, the 6630XP produces up to eight pages of letter-quality type per minute. Two type styles are built-in, and additional font cartridges are available.

The printer interfaces with IBM systems via standard twin-axial cable. For remote applications, the printer may be connected through an IBM 5251-12 or 5294, the vendor said. The 6630XP is priced at $5,995.

General Business Technology, 1891 McGaw Ave., Irvine, Calif. 92714.

GOULD, INC.
Colorwriter 6120

Gould, Inc.'s Recording Systems Division, has announced the Colorwriter 6120, a seven-pen, general purpose plotter for business, scientific and engineering graphics.

The Colorwriter 6120, with RS-232C or Centronics Data Computer Corp.-type interfaces, is said to be compatible with Lotus Development Corp.'s 1-2-3 and Symphony, Sorcim Corp.'s Supercalc 3, Ashton-Tate's Framework, Decision Resources, Inc.'s Chartmaster and Signmaster and Graphic Communication; Inc.'s Graphwriter.

Features include paper size selection, front panel pause, reset and scale controls, a 7 in./sec plotting speed and .002 in. resolution. Prices begin at $895.

Gould, Recording Systems Division, 3631 Perkins Ave., Cleveland, Ohio 44114.

SYTEK

from page 47

store a list of authorized users and certain characteristics about each user in its memory. The Authentication Server is also said to maintain a record of user logon attempts in memory.

Sytek said the system will be available in mid-January. The price for one Authentication Server and 50 Passports will be $31,000. An additional server would cost $25,000, while another 100 Passports would cost about $8,000.

Additional information is available from Sytek, Data Security Division, which is located at 1225 Charleston Road, Mountain View, Calif. 94043.

And now . . .

The Perfect VSAM Solution.

NATURAL

For high-powered application development
using VSAM files.

ADABAS/VSAM Bridge

For migrating VSAM-based
applications to the power and flexibility of ADABAS.

At last there's a way for the organization with a major applications investment in VSAM to benefit from all the advantages of a relational data base, integrated fourth-generation language and data dictionary . . . with none of the time and expense associated with traditional conversion efforts!

At Software AG, each product in our integrated system grows naturally from the one before it, and all of our products speak the same language. And that's the proper plan for the world leader in advanced systems software. Call us today.

1-800-336-3761.

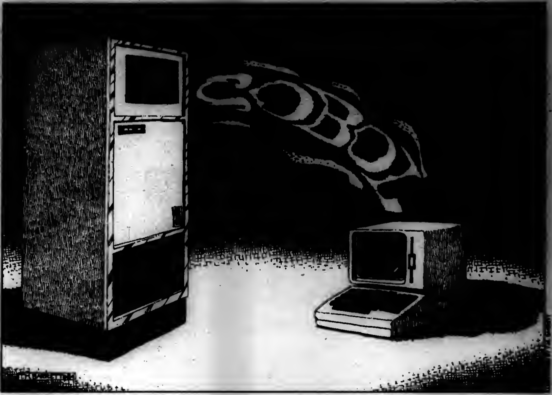
SOFTWARE AG

ADABAS • NATURAL • COM-PLETE

**Where the future
comes as no surprise.**

CW 1110

IN DEPTH



Running your Cobol on micros

(at least some of it sometimes)

By Anthony Fedanzo Jr.

Any Cobol programmer should be able to begin programming on a micro within a week — given microprocessor hardware, a Cobol compiler, word processing for source editing and a data communications package to transfer source and test files.

Even in this age of the microprocessor, the tremendous investment in existing Cobol applications should be exploited as long as possible.

Major vendors such as IBM, Hewlett-Packard Co. and Digital Equipment Corp. have responded almost without notice by providing 16-bit machines to run many mainframe and minicomputer Cobol applications. This response is possible because these companies and other 16-bit systems vendors run Microsoft Corp.'s MS-DOS operating system and one of several Ansi Cobol-74 implementations.

With some relatively minor modifications, many existing mainframe and minicomputer applications can be transported to available 16-bit micros. Two conditions favor decentralized computing by distributing work to microprocessors: the cost of creating replacement application systems and the backlog of systems development.

Microprocessor distributed data processing (DDP) affords the benefits of decentralized computing along with a potentially large saving that would otherwise be expended on replacement systems. While each vendor's product runs a slightly different version of MS-DOS, the fact that they have this common operating system means they are very similar from an applications perspective.

Little, if any, discernible difference exists between Cobol applications on a major vendor's system and those of the so-called IBM Personal Computer clones. At the level of MS-DOS and Cobol, the similarities between 16-bit micros far overshadow their differences. This situation is unparalleled in the mainframe and minicomputer market, where vendor-to-vendor application transfers are frequently difficult even at the source-code level.

Compatibility of the basic operating system from vendor to vendor has made it possible to implement standard Cobol (and enhancements) on a wide variety of 16-bit systems. Most major vendors have contracted with a software company to implement the version of Cobol they offer. With few exceptions, these implementations are Ansi X3.23-1974-compatible. At this time, there does not appear to be a push taking place to implement Cobol-80 on microprocessors. It is reasonable to assume that the lack of a new version of Cobol simply reflects a benign neglect on the part of vendors and software houses, rather than a deliberate plan to retard the spread of Cobol in the micro world.

> ***The real and potential benefit to corporate and small-business computer users stemming from this standardized micro operating system and language is the opportunity to implement DDP on systems costing $4,000 or less, while using existing source code.***

Similar implementations of Fortran 77 (Ansi 3.98) have taken place within the last two to three years. It is now possible to transport Fortran 77 code from, for example, an HP 3000 minicomputer, make a few slight I/O syntax changes and then bring it up on either an IBM Personal Computer or HP 150 without further modification. Business applications and some scientific Fortran applications can be moved from system to system with very little modification to the source. Because most business applications are written in Cobol, that language will serve as the exemplar for microprocessor DDP as outlined here.

The real and potential benefit to corporate and small-business computer users stemming from this standardized micro operating system and language is the opportunity to implement DDP on systems costing $4,000 or less while still using existing source code. Existing source code in Ascii format can be downloaded to a micro via the available data communications packages, then modified slightly for differences in disk I/O, file types and CRT handling, as required.

The minimum microprocessor hardware required for practical microprocessor DDP is a 256K-byte system with two floppy disk drives. Increasing memory or adding a hard disk expedites the course code conversion task in many cases, but it is not essential. It is fairly easy to convert 2,000-line Cobol programs that access files containing thousands of records using a 256K-byte microprocessor system with two floppy disk drives.

If you are planning on doing a substantial volume of Cobol work, the added expense of larger memory and a hard disk on development systems are worth the cost. The major problem to avoid when using large microprocessor development systems is the chance that executable program size will exceed the main memory limitation of the intended target hardware. This problem can be kept under control by keeping a target machine near the development system for testing purposes.

Advantages of Cobol

Most of the attention that Cobol on microprocessors has received centers upon using the micro as a programmer's workbench. While this is certainly a useful approach to off-loading mainframe tasks, it is only one side of the potential use of Cobol on micros. The other side is implicit in the very ability to write and compile mainframe-compatible Cobol on a microprocessor in the first place.

For buyers of 16-bit microprocessors, the "gee-whiz!" emphasis of much software advertising and the problems of coupling micros to mainframes in useful configurations has tended to obscure the fact that they are general-purpose computers in their own right. The ability to function as stand-alone machines means normal Cobol and Fortran programming tasks can be conducted on these systems. When this capability becomes noticed, it's natural to begin thinking about using them to run routine business applications just like their 16-bit minicomputer and larger mainframe cousins.

When micros are used to run routine applications, the goal of centralized data type and format control can be attained while still allowing individuals and groups local control of the data itself. This accomplishment goes a long way toward distributing and decentralizing data processing without abandoning the equally desirable goal of maintaining a single organizational data standard.

INTRODUCING THE VAX 8600 SYSTEM.

Your applications can do exactly what you want them to on Digital's new VAX™ 8600 computer system. They can expand.

User population can increase. Scientific problems can become more complex. Transaction volume can intensify. And data storage requirements can grow exponentially.

The VAX 8600 system gives you unprecedented capacity for applications growth. It's the first of a new generation of large scale VAX processors, with memory expansion to 32 million bytes and online storage up to 160 billion bytes. Yet the VAX 8600 system maintains complete architectural compatibility with every other VAX processor – including the new desktop-size MicroVAX I™ system. Every system in the family gives you the same VMS™ operating system software, with the same set of proven development tools, communications options and data management facilities. Quite simply, there's not another computer family in the world that can match the growth path you get with Digital's VAX systems.

YOU GET UP TO 4.2 TIMES THE PERFORMANCE.

We've engineered the VAX 8600 system to deliver more than four times the processing speed and performance that the industry-standard VAX-11/780 system is known for. We've achieved this performance increase through the use of ECL gate array technology and several advanced engineering techniques.

Specifically, the VAX 8600 system incorporates four-stage pipelined processing that increases throughput by allowing the system to execute one instruction while it simultaneously decodes a second, generates an address for a third and fetches a fourth. There's also a floating point accelerator that speeds floating point operations.

Even with all its power, the VAX 8600 system conserves floor space. The CPU fits into the same size cabinet as the VAX-11/780 CPU. Power consumption and air conditioning requirements are similar, too.

VAX 8600 SYSTEM HIGHLIGHTS

MAXIMUM MAIN MEMORY SIZE 32 Million Bytes
MAXIMUM STORAGE CAPACITY 160 Billion Bytes
MAXIMUM COMMUNICATION LINES 512 plus Local and Wide Area Networks
PROGRAM ADDRESS CAPACITY 4 Billion Bytes
BUS SUPPORT Availability includes 6 UNIBUS,™ 2 SBI, 4 DR780, 3 CI and 4 MASSBUS™
PHYSICAL DIMENSIONS 60½" x 73½" x 30"
POWER CONSUMPTION 6.5 KW (10 KVA)
AIR CONDITIONING REQUIREMENTS 22,200 BTU/hr
ACOUSTIC LEVEL 60 dBA

VAX 8600

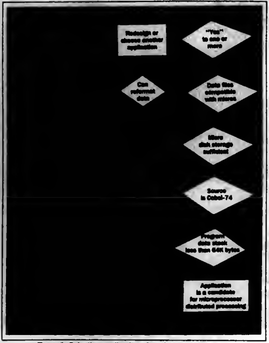

Redesign or choose another application
"Yes" to one or more
Can reformat data
Data files compatible with micros
Micro disk storage sufficient
Source is Cobol-74
Program data stack less than 64K bytes
Application is a candidate for microprocessor distributed processing

Figure 1. Selecting applications for microprocessor DDP

The limitations on types of applications that are candidates for transporting to microprocessor DDP are mostly hardware-related. Even the new 16-bit micros do not handle large data bases with many access paths very efficiently.

Minimal user retraining is required when existing applications are simply transported to a microprocessor environment. This factor is especially important in light of the time and expense required to train users in various applications. Because the microprocessor itself will require learning new skills, time saved not learning the application will be available for gaining familiarity with the new hardware and procedures.

User familiarity with existing applications can serve as a tool for building basic confidence in those who lack skills or are reluctant to approach the burgeoning generation of microprocessors. Most users will approach a microprocessor with less trepidation if they can still use a man-machine interface with which they are already familiar. This familiarity will be most helpful for batch-entry systems and operators, but it extends to even the more sophisticated look-up and accounting-type systems and to their users as well.

Another notable advantage of transporting existing applications to micros lies in the fairly small amount of DP staff retraining that is required. Since most shops operate with a staff of more or less competent Cobol programmers rather than Pascal or Basic wizards, the expense of either retraining or hiring experts in these other languages can be avoided.

Data processing management must provide its staff with the microprocessor hardware, a Cobol (or Fortran) compiler, a word processing package for source editing and a data communications package to transfer source and test files from host systems to the micro. With these tools, nearly any Cobol programmer should be able to begin programming on the micro within a week. The approximate cost of a compiler, word processing package and communications package is $1,500. Very generous discounts are available from some dealers.

Suitable applications

Most batch data entry systems are suitable candidate applications for microprocessor DDP. This covers the range of those that simply accept input from the CRT and pass it to a plain file, through those that do online validation of key items such as names, Social Security numbers, client IDs and the like. Branch office project management and inventory control systems exemplify other kinds of applications that are readily transported to a microprocessor. This transportation makes the most sense when packaged software either is not available or would require significant conversion from existing systems to utilize.

Figure 1 shows the general procedure for determining whether an application is a likely candidate for conversion to microprocessor DDP. The essential steps are those that determine data structure, operating cost and program size factors. If these criteria are satisfied, most applications that satisfy them can be moved to a microprocessor.

Locally relevant detail is not always required by a home office. Many time-sharing systems can be transported to and implemented on local microprocessors with a minimum amount of change. Typically, older systems are easier to convert to microprocessor DDP since they tend to be built in less highly integrated modules than newer systems. Micro-to-host data transfer can be facilitated by sending all data in fixed format Ascii files.

This strategy succeeds in most cases because summary reporting rather than wholesale data base transfers frequently constitute the bulk of micro-to-host interactions. In addition, so long as both host and micro can manipulate Ascii data with minimal conversion it is the simplest solution to the data exchange format problem.

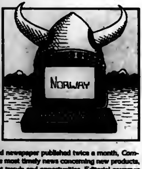
For example, an accounts receivable and payable system based on local invoice billing cycles is operable independent of a host system if the Cobol source code and keyed files (Isam or Ksam) are transported to a micro. Since the information a head office typically requires includes weekly sales volumes, plus accounts receivable and accounts payable balances by general ledger account number, this data can be processed locally and sent to the host in summary form.

At this time, the limitations on types of applications that are candidates for transporting to microprocessor DDP are mostly hardware-related. Even the new 16-bit micros do not handle large data bases with many access paths very efficiently.

This factor tends to exclude software that is built upon data base management system (DBMS) packages until Cobol-accessible versions of the mainframe and minicomputer DBMS software are available on micros. It is, however, quite feasible to send subsets of large data bases to micros so long as the transfer takes place in a suitable data format and the data can be held and used locally in plain or Isam files. Transmission of subsets of host data bases will probably comprise the bulk of host-to-micro communications in a microprocessor DDP network.

Technical considerations

A 16-bit microprocessor has an inherent data stack limitation of 64K bytes. This means that applications from 16-bit minicomputers will transport without encountering this limitation. Minicomputers and mainframes that have a larger word size or data address could present problems if the programs to be transported to a micro use a data area larger than 64K bytes. In these cases, the solution is to modularize the program's tasks by either creating separate programs that are run separately or separate programs that are



"The computer is down."

It is ironic that when we become dependent on computers, we are at their mercy. As more and more companies go on line, the industry reliability standard of 98.5% becomes unacceptable because it means your computer is liable to go down once every two weeks, on a statistical average.

So, if you are a broker, banker, manufacturer, or businessman who relies on your computer more and more, take note: Stratus Computers are designed not to fail; not once every two weeks, or once every 200 weeks, or once every 2,000 weeks!

Debunking The Myth That All Fault Tolerant Computers Cost More.

It is a common and reasonable assumption that because there is redundancy (extra programming, or extra components) in fault tolerant computers, that makes them cost more. Where the redundancy is in expensive software, this is true. But Stratus has hardware-based fault tolerance that takes advantage of the extraordinary advances in chip technology. The result – price drops. The fact of the matter is, our hardware redundancy adds a mere fraction to our cost, and absolutely nothing to your purchase price. What's more, in overall price/performance comparisons against the top computer names, including IBM, DEC, and Hewlett Packard, Stratus was at the front of the pack, despite the fact that it included fault tolerance, while the others didn't.

	STRATUS XA400	IBM 4381	HP 3000 68	DEC VAX-11/782
RELATIVE PERFORMANCE*	125	100	64	109
PRICE	$446,350	$707,897	$437,754	$656,889
PRICE PERFORMANCE	$ 3,571	$ 7,079	$ 6,840	$ 5,999

Relative Price Performance Index
**Computerworld, August 20, 1984*

All systems are comparably configured with identical amounts of memory, disk space, and communication lines. But, only the Stratus price includes fault tolerance.

Why Stratus May Be The Best Computer For The Times. For The Money.

Considering its showing in overall price/performance comparisons against the most successful computers, Stratus must be considered. And when you take into account the added efficiency and security of fault tolerance, and the fact that it is the world's most powerful fault tolerant transaction processing computer, Stratus truly becomes impossible to ignore. In the 1980's Stratus simply is the right computer, at the right price. For information, contact your local Stratus sales office, or call Keith Johnson in Massachusetts at (617) 460-2188, or toll-free at 1-800-255-1515.

Stratus.
CONTINUOUS PROCESSING™

Now that the world relies on computers, it needs a computer it can rely on.

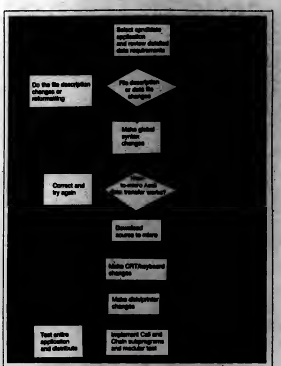

Select candidate application and review detailed data requirements
File description or data file changes
Do the file description changes or reformatting
Make global syntax changes
Host-to-micro Ascii data transfer works?
Correct and try again
Download source to micro
Make CRT/keyboard changes
Make disk/printer changes
Implement Call and Chain subprograms and modular test
Test entire application and distribute

Figure 2. Mainframe-to-micro Cobol conversion process

linked via the CHAIN statement familiar to Basic users.

As outlined in Figure 2, there is a general procedure for transporting and converting applications to a 16-bit micro. Note that the selection process shown in Figure 1 leads into the tasks required for actually doing the application transportation and conversion. As noted previously, the key factors in such a conversion center upon data, then programs, once the cost justification is completed.

Generally, those applications written in Cobol (or Fortran) that utilize plain files, Isam or Ksam files or relative (random or direct) access files can all be transported to major vendor's 16-bit microprocessors. Practical limitations on program sizes are discussed below and have to be considered on a case-by-case basis.

One obvious limit to program size tends to be just how long it takes the microprocessor to execute a code segment before getting back to the user. In Cobol, one hundred lines of IF . . . ELSE . . . logic seems to be a practical limit above which people notice that response time is not virtually instantaneous. Good structured programming will help minimize this perceived execution time significantly.

As on many mainframes, data files accessed by Cobol programs exist in a Cobol format that requires some minor, but necessary, reformatting before they can be transferred as plain Ascii files or used by programs written in another language. For example, micro Cobol sequential files have two leading bytes of data prefixed to the data files. Relative files have six bytes of header information in the first record of each file. Index files have three bytes prefixed to each data record plus a separate key file.

This file and/or record housekeeping information is transmitted to the host by the available data communications packages. Therefore, it must be stripped off prior to transmission by the micro or upon receipt at the host. In either case, the task is a fairly trivial exercise in data reformatting.

Until a major vendor releases a DBMS package that can be accessed by micro Cobol, three familiar file types make up the range of data storage formats available. These are plan sequential, relative and Index (Isam) files.

Sequential files are available in two forms, depending upon whether the file was created within the micro Cobol environment or from another source such as a word processing package. The relative files, sometimes called direct or random-access files, are used virtually identically to those found on mainframes and minis. Index files in micro Cobol allow a single key only, usually up to 60 characters in length. Judicious selection of the fields making up this key will usually allow it to do double duty as a more complex sorting method.

It is worthwhile to attempt to emulate the microprocessor environment on your mainframe, at least with respect to file structures. This will assist in pretransport changes and provide an opportunity to think through potential problems before they are encountered on the microprocessor. A related advantage of an emulation step is the fact that program changes can be made much faster on most mainframes and minicomputers than on a micro. This saving of time can be significant when many programs or lengthy programs need to be transported and converted.

CRT screen displays usually are defined and used within a single micro Cobol program. Two general methods exist for doing this. The first is via the screen section declarations of the data division. In this section, row and column references position field headings, variable fields and their edits. These are referenced by DISPLAY and ACCEPT verbs that simply name the declared screen records.

The second method of CRT handling utilizes direct row and column addressing in the DISPLAY and ACCEPT verb syntax to achieve the same screen layouts as found in the screen section. There are fewer editing options available to the programmer in this second method, but it works equally well.

Most 132-column (or less) line-printer reports will convert to output on a microprocessor provided two basic conditions are met. First, the WRITE statements must be standard Cobol-74 and contain no machine-dependent carriage control that lacks a counterpart in the micro. Second, the printer selected for the microprocessor must be able to print a full 132 columns; many small system printers print only up to 80 columns. You should also consider whether you need multipart forms. Generally, it is difficult to get more than three-part carbon forms to give a clear image on small-system impact printers.

Hardware requirements

The hardware required to compile micro Cobol programs depends upon the program size. A 256K-byte microprocessor with dual floppy disk drives can easily handle 2,000-line Cobol programs. Compile time for programs of this size is about 15 minutes, including generation of the disk image of the listing file. Linking compiled code is done in a second step, as is usual on mainframes and minis. Actual program execution requires that a special Cobol environment file be resident on disk with the application program(s). At runtime, it is loaded into memory along with the application code, for which it provides a runtime library and debug interface.

Most competent Cobol programmers will have little trouble switching between mainframe or minicomputer Cobol and that available on micros. Structured coding techniques still apply to this environment, as do the usual concerns about data editing and security. A great advantage of using Cobol on 16-bit micros resides in the very low level of programmer retraining required. This holds even more true when the programming task is simply transporting existing code to the smaller machines.

Data security on a microprocessor requires careful consideration. Since no single-user 16-bit microprocessor available today has an automatic, foolproof logon/logoff event record, the need for sensible physical security of sensitive data and programs is evident. Physical security in the form of restricted access to the system and data disks is probably the most useful security measure to safeguard your information.

It is easy to add an encryption/decryption algorithm to your Cobol programs or their runtime library to scramble the data in the files accessed. When this measure is taken, distribute only the executable versions of programs to the remote user microprocessors.

Management perspective

The microprocessor may be the wave of the future, but it is a wave that conceals potentially disastrous undercurrents as well as the promise of more effective computing. The programming environment available on 16-bit micros today resembles that available on minis and mainframes during the mid-1970s. Managers should allow for extra man-hours in their estimates of project time because the relatively fast development tools and compilers found on larger systems are not yet on the market for micro versions of Cobol

and Fortran. Use of hard disks and more main memory will alleviate this situation somewhat, but allowing for the extra time is still prudent.

Consequently, transporting software to micros is faster than writing applications on micros from scratch. Global syntax changes can be made to entire source files prior to transferring them to the micro, where editing and compiling are relatively slow.

These differences in overall performance during programming phases of a microprocessor DDP development project indicate the need for careful advance planning and scheduling. In cases where a new system is scheduled for development of a micro DDP system, coding is often more efficiently handled on a mainframe. It can then be transported to appropriate micros for final development and installation.

In many cases, given appropriate project planning and using a standardized hardware and software base apon which to build applications, the cost of transporting existing Cobol application systems to a microprocessor environment also compares favorably with that of creating whole new applications on them. Again, this is because the task of transporting existing source code is often less costly and time-consuming than that of ground-up analysis, design and implementation.

The issue of who buys the microprocessors in an organization should not seriously impact whether they can be used in a microprocessor DDP strategy. A wide degree of latitude in purchasing micros can be accepted so long as those that are acquired all meet some basic requirements.

In order to use the kind of microprocessor DDP strategy outlined here, all 16-bit micros purchased should be able to use MS-DOS Level 2.0 or above. An X3.23-1974 Cobol language and linker compatible with the MS-DOS operating system should be available. A good data communications package for file transfers to and from host systems should be supported on the microprocessor. These are basic requirements in most planned micro acquisitions and place few, but still firm, restrictions upon the number of vendors from whom hardware can be selected.

User familiarity with existing applications tends to facilitate their conversion to a microprocessor environment. Unless the application is seriously in need of revision or replacement, transporting programs to micros compares favorably with buying packaged software. Even the best packages will require time-consuming learning of some entirely new procedures, plus necessitate fairly radical data format conversions if existing data is to be somehow moved into the package's files automatically.

In the worst case, a package will require manual reentry of large volumes of data already on file. Microprocessor DDP allows electronic transfer of this data with no manual reentry.

Any company that has spent time and effort to develop an organizational data standard will not readily abandon that standard just because packaged microprocessor software does not adhere to its standard. Since existing applications presumably already meet the organizational data standard, their migration to a micro poses no serious problems for maintaining the accepted standard.

Transporting programs to micros often compares favorably with buying packaged software.

This consideration can be crucial if the consequence of using a packaged product entails loss of central control over data formats, edits, validations and types. Where this is an issue, microprocessor DDP using transported applications is a reasonable alternative to changing a data standard or the organization's way of doing business.

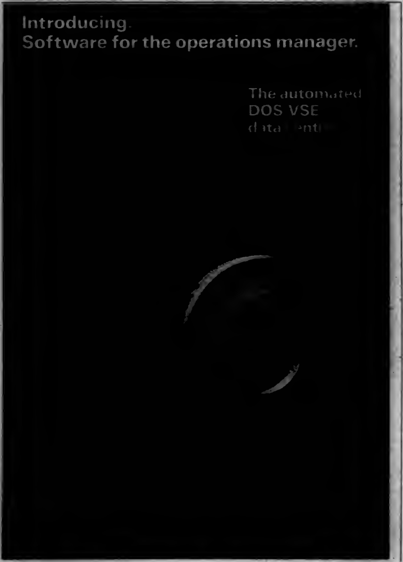
DDP is lauded for its role in reducing data communications costs, especially when replacing time-sharing systems. Microprocessor DDP also provides the same benefit as a communications cost saver. In addition, the new 16-bit systems provide intelligent single-user workstations for word processing, spreadsheets and graphics. A workstation may not always be cost-justified solely for word processing or spreadsheet usage. But because it can also be used to reduce data communications expense, the synergism of multiple uses for the same hardware ultimately justifies the initial expense.

In the final analysis, the 16-bit microprocessor is a computer in its own right. If it is used with that fact firmly in mind, these machines can make a valuable contribution to the overall efficiency and effectiveness of a firm's computing services.

The rationale for introducing microprocessor DDP can be based upon reducing I/O loading on the mainframe, reducing communications costs, maintaining an organizational data standard or allowing the use of new technology without massive retraining. The success of the undertaking ultimately will depend upon a planned approach and a healthy dose of common sense.

About the author

Anthony Fedanzo Jr. is data processing manager for Harding Lawson Associates, a geotechnical engineering firm in Novato, Calif. He has 10 years' experience with both scientific and business data processing and communications.



The changing picture of federal office systems

By Charles Gularson and Cheryl Smith

Federal government office systems are undergoing widespread changes. The trends include larger systems purchases, more single-vendor microcomputer buys, more systems integrator-type procurements, greater integration of micros and increasing incorporation of office systems organizations into information resource management departments. Internal networking is still in the early stages in government offices, with private branch exchange (PBX) systems and broadband networks being pilot-tested more and more frequently.

These were the findings at a special meeting of the federal government office systems program directors at the Federal Office Automation Conference earlier this month. More than 40 directors of major federal OA programs attended a directors' roundtable discussion, which centered on OA policy, planning and implementation.

A lot has changed in the last year. Just one year ago at the 1983 Federal Office Automation Conference, the program directors of more than 30 key government agencies stated that integration of multiple-vendor office systems was a fundamental problem. Integration is still a problem because most agencies have a multivendor environment. In fiscal year 1983,

88% of federal agencies were serviced predominantly by a single vendor, compared with 74% in 1984. Internal networking was a potential solution to integrating multiple-vendor systems. However, less than 10% of the agencies were pilot testing internal networking systems in 1983; less than 50% were even considering the implementation of internal networks.

This year, most major government agencies are considering internal networks, but less than 40% have pilot projects under development. The use of internal networking is expanding but is still not part of the standard federal government agency office system.

The trend is toward broadband networks and digital PBX systems. The broadband systems are concentrated in the defense agencies and civilian agencies that interface most directly with the defense agencies. It appears that most civilian agencies are using baseband systems and reviewing digital PBX systems as a potential method to integrate data and voice system requirements.

Another internal networking trend in the federal government is the linking of microcomputers into terminal or personal computer networks. Hard-wired connections are costly, and long delays are caused when terminals are relocated as organizations change. To avoid this problem, government agencies are implementing permanently installed terminal networks — a single logical network — to link microcomputers and terminals.

Terminal networks provide for low-speed communications between user devices and can be either part of a broadband solution to connectivity or are a separate baseband or twisted-pair solution to internetting terminals. As the organization changes, microcomputers and terminals can be moved along with the personnel and relinked into the centralized or geographically concentrated terminal network.

Other networks being pilot tested in the federal government are office systems networks to integrate minicomputer-type office systems. These networks interconnect the processing and communications components for geographically localized groups of users. They can range from a single physical network serving the entire group to a hybrid office system network composed of several physical networks interconnected to each other via gateways to form a single logical network service.

Another internal networking trend in the federal government is the development of mainframe networks such as Network Systems Corp.'s Hyperchannel. The mainframe network provides a high bandwidth connection between mainframe computers that perform a large number of high-speed, high-precision computations and support large program libraries and data bases. The mainframe network permits the high-speed transfer of files and more timely access to mass storage devices.

The type and structure of the internal network being considered is directly related to the way the agencies are organized and the age and structure of the buildings. In some buildings, the walls are very thick, and it would be prohibitive to install centralized single physical cable-type networks. In these cases, most agencies are reviewing digital PBXs and smaller geographically located networks.

As of this year, more than 90% of all agencies have implemented electronic mail and spreadsheet applications.

If agencies are centralized organizationally and not constrained by building structure, more broadband cables are considered for implementation. In many respects, this is obvious and reflects the characteristics and operating culture of the specific agency. But it is interesting to note that less than 40% of the government agencies have internal networking pilot projects under development.

Applications development

Another interesting trend is the rapid development and implementation of office applications. In 1983, approximately 90% of the agencies had implemented word processing, and about 80% had implemented some sort of electronic mail system. The statistics dropped rapidly in the area of applications usage. Less than 50% of the agencies last year had implemented some sort of electronic spreadsheet.

In 1984, more than 90% of all agencies have implemented electronic mail and spreadsheet applications. In addition, more than 70% of the agencies already installed or plan to implement other centralized administrative support software. This support software includes:

- Electronic filing.
- Electronic calendar management.
- File interrogation and report generator.
- Data base management.
- Dictionary functions.
- Project management and tracking.
- Correspondence control.
- On-line training systems.
- Directory services.

IBM's Professional Office System, Digital Equipment Corp.'s All-in-one, Wang Laboratories, Inc.'s VS Express, Hewlett-Packard Co.'s Desk Manager and Data General Corp.'s Comprehensive Electronic Office are growing in popularity as basic OA

Anticipation.

Figure 1. Applications implemented in fiscal year '83 compared with '84

end-user tools. They are one reason for the growth in usage of administrative support software. Another reason is the increased usage of these packages in microcomputers. Approximately 50% of the responding agencies have now installed these applications compared with 20% in 1983 (see Figure 1).

Merging text, graphics

One area in the federal government where there has been little applications development is in the graphics area. Most agencies are using standard business graphics software that operates on microcomputers, but few have comprehensive systems that merge text and graphics. However, several agencies have data interchange research experiments under way.

The Department of Defense, in cooperation with the National Bureau of Standards, launched a program to expedite the development and implementation of data interchange standards required in a computer-aided graphics program. Over the past decade, there has been an increasing need to exchange graphics and textual data. The types of equipment would include word processors, electronic typewriters, communications terminals, electronic copiers, character printers, typesetters, graphics devices, computer-aided design systems and many others.

This growing demand for data interchange has led to the formation of the Data Interchange Study Group, under the auspices of the American National Standards Institute, to examine data and data interchange requirements for programming languages, office systems, open systems interconnection, data representation, graphics, data dictionaries and data bases. Initial Graphics Exchange Specifications, Graphical Kernel System, Core, Programmer's Hierarchical Interface to Graphics and North American Presentation Level Protocol Standard are some of the standards under review.

More than 60% of the agencies have a need to merge text and graphics, but additional research and development is required before doing so is cost-effective.

Procurements change

Last year, more than 50% of the federal agencies were planning large office systems buys, and almost 30% were planning large microcomputer buys. Several large microcomputer buys were completed in 1984. The U.S. Navy and the Air Force jointly procured more than 10,000 Zenith Data Systems Corp. 150s (IBM-compatible personal computers) and just recently completed a procurement for Zenith Tempest-certified personal computers. The Department of Defense recently completed a joint service procurement for more than 3,400 IBM Tempest-certified personal computers. The list goes on and on.

A major concern a year ago was that most personal computer buys were stand-alones, and no provision for networking these units was made. This, too, has changed. Several agencies have expanded the procurement requirements to include personal computer-type networks and protocol converters.

"A dynamic trend," according to Randy Ivanciw, who assisted in the development of the Program Directors Roundtable, "is for agencies to avoid the possibility of multiple and noncompatible personal computers by procuring large numbers of units that can be networked."

The procurement trend seems to be in the direction of developing specifications for a central CPU or file server for centralized storage, processing and data base management systems with personal computers serving as multifunctional workstations. It appears that the personal computer, with up to 10M bytes of storage, is quickly becoming the de facto multifunctional workstation for which the government has been looking.

Large centrally controlled office system purchases seemed to be the norm rather than the exception during fiscal year 1984. TRG Washington Group predicts that this trend will continue and increase in 1985. Many agencies choose to avoid

[illegible] processing
[illegible] for

[illegible] records

A MEDICAL RECORDS SYSTEM THAT WORKS JUST LIKE YOUR CENTRAL NERVOUS SYSTEM.

[illegible] and stored [illegible]

[illegible] created [illegible] system for hospitals that works [illegible]

[illegible] combination of [illegible] data processing [illegible] called [illegible] Transcription [illegible] Chart Tracking [illegible]

[illegible] the finest medical [illegible] with our [illegible] line of hardware, [illegible] is another unified solution [illegible].

[illegible] is built around Honeywell's Office Automation System (OAS), designed to free hospital staffs from redundant and time consuming tasks, while improving speed and accuracy at the same time.

In addition, TRACTS minicomputer operating systeni GCOS 6 MOD 400, offers a wide variety of data processing options. Data base management systems, high-level language support, custom application programs, and data communications are all part of TRACTS.

The system also supports electronic mail, InfoCalc, file tranfers and an array of other application programs. No other system is so complete.

And when hospitals can operate with that kind of precision, we all benefit from better health care.

Find out more about TRACTS today. Call us at 800-328-5111, Ext. 2747 (in Minnesota, call collect: 612-870-2140, Ext. 2747.) Or write to the Honeywell Inquiry Center, 200 Smith Street, Waltham, MA 02154. We'll be happy to send literature, discuss the system with you, and even arrange a demonstration.

[illegible] handle many office processing functions
[illegible] generation of correspondence.
Parameter driven TRACTS system
can be tailored to meet specific requirements.

Figure 2. Major issues and concerns

interoperability and interconnectivity problems by standardizing on single vendors or multiple vendors with very specific communications protocols: the Intelligence Community and State Department field offices on Wang, the Forest Service on Data General and the Treasury Department Headquarters on DEC.

Procurements are now more functional-specification rather than hardware-specification-oriented. Procurements include the full range of functional requirements, including software (both system and application software capabilities), maintenance, end-user training and systems engineering support.

As experience grows in OA procurements, a lesser emphasis is being put on just the hardware costs. It appears as though the 100% hardware with 100% cost procurements are gone. Too many agencies have been stung by procuring the least expensive hardware buy. It appears cost-effective, but it couldn't be further from reality.

Today's more progressive agencies look toward life cycle cost — the cost over the life of the project. This means that the total cost to implement a system is being evaluated. More agencies want one contractor to provide the hardware and the software required to automate the major functions of the agency, maintain the system, train the end users and resolve any interface issues necessary to make the system fully operational.

In fiscal year 1983, the agencies talked about this concept; in fiscal year 1984 they did something about it, and in fiscal year 1985 it appears as though it will be standard operating procedure.

Organizational aspects

Information resource management (IRM) has been in effect for more than a year. It appears as though IRM departments are more and more responsible for office systems, but the culture or nature of the IRM department is changing. One year ago, data processing professionals did not have an appreciation for the role OA had in information management. That is rapidly changing.

The merging of the information technologies — data processing, records management, communications and OA — is affecting every federal agency. While each agency is addressing the blend of technologies and procedures of IRM differently, they are addressing them in a more structured, comprehensive approach.

OA procurements now include the communications requirements, interoperability with the agency's mainframes requirements and records storage capabilities that were often missing in the specifications a few short years ago.

The major issues and concerns of organizations have shifted from funding to cost/benefit analysis and the technical problem of interfacing to the agencies' mainframes. Figure 2 depicts this shift. The shift will influence the internal structure of IRM organizations.

The federal government has been accused of being behind private industry in the development of complex office systems. Nothing could be further from the truth. At the Program Directors Roundtable at the 1984 Federal Office Automation Conference, more than 45 representatives from approximately 35 key agencies and subagencies discussed how to implement office systems on a cost-effective, productive basis in the federal government.

The trends revealed that the federal government is moving rapidly toward larger, more centrally administered procurements of compatible systems, more microprocessor-based systems, more broadband and digital PBX-based communications capabilities, more integration of text and graphics and more integration of voice and data. One thing is clear: Leading government agencies will be a significant force in the setting of standards for office systems in the second half of the '80s.

About the authors

Charles Gularson was industry chairman of the Federal Office Automation Conference held in Washington, D.C., Nov. 6-8 and moderator of the Office Automation Program Directors Roundtable, where he presented his survey results. He is president of TRG/Washington Group, Inc. in Falls Church, Va.

Cheryl Smith is director, advanced office systems, of TRG/Washington Group.

Who Are End Users?

By Leilani Allen

The challenge for the information engineer is to see beyond the broad label "users." Then he can match technical support to individual needs and wants.

More than ever before, businesses need an experienced professional to plan for meeting end-user service needs with optimum capacity at reasonable cost. This function will be the province of the information engineer.

Users in 1990 may be classified in three general categories, based on different sets of needs and problems that require different systems solutions. These categories are; central site users, remote users and telecommuters. The categories, in turn, may be subdivided into classes.

The information engineering needs of each subgroup are assessed according to four information areas: processing, storage, transfer and management. The following groups come under the category of central site users:

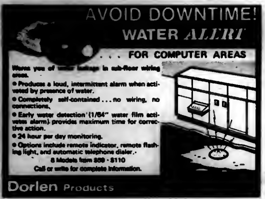
Clerical. Among information users, this group is still likely to be the largest. Its needs are probably easiest to assess. Typical applications will continue to be data entry (especially the feeding of production information bases), information base inquiry and update, report production and (to a more limited extent) word or text processing.

This work will require massive amounts of storage (both direct-access storage devices and mass storage devices). Processing will still be done largely on the mainframe, although some word processing and ad hoc report writing may be transferred to multiuser, mini or micro configurations.

Transfer capabilities will not be especially significant, since this type of user will generally experience information coming to him, in the form of customer phone calls or invoice records. However, there may be some element of data transfer from automatic scanning devices (such as for inventory applications) or in batch mode from outlying sites without their own processing capabilities.

The management component will concern itself with production information base design and maintenance, data security, update standard enforcement, backup and recovery. Sophisticated, real-time performance monitoring, analysis and diagnostic tools will also be essential.

Professional. IBM estimates that by 1990, 50% of all professional workers will have direct access to the computer system. International



Data Corp. puts the figure at 65%. This class includes analysts and managers of all types, engineers and programmers. Typical applications will be spreadsheet and statistical analysis, modeling, graphics, computer-aided design and text processing. The majority of processing will be done on micros and minis, with the ability to download data from the mainframe. With the exception of computer-aided design and manufacturing, incremental storage requirements will be fairly negligible, and transfer requirements will be confined primarily to electronic mail and access to external information sources via time-sharing vendors.

Management issues will include data handling protocols, the enforcement of design standards and integration of information bases. Capacity management will be particularly crucial because this type of work tends to grow in a volatile and significant fashion. Analysis of employee productivity, particularly the relationship between given levels of response time to productivity, will be a major focus.

Executives. There is no question that this group will experience increased hands-on use of the computer. However, few executives will use the computer as their most trusted or most frequently accessed information source. It is interesting to note that much of the current discussion of computer tools for executives centers around the need to provide executives with direct access to the production information bases. This need is based on the assumption that executives will want to enmesh themselves in detailed data manipulation and analysis. Yet executives themselves are far more interested in the big picture.

Access to production information base data will, in all likelihood, be provided by means of daily summary files created by subordinates that can be downloaded to the executive workstation. There, a sophisticated decision support system interface will use the data to update a variety of "canned" graphical and report formats that have been customized to the executive's preferences.

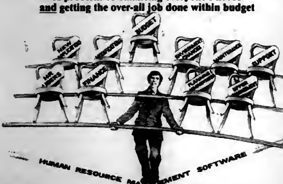
Rather than learning programming syntax and commands, the executive will merely type one character (for example, "S" for "sales report") or point to a report icon on the screen. The program will then show the executive the latest indicators and a variety of "what if" scenarios based on preprogrammed assumptions.

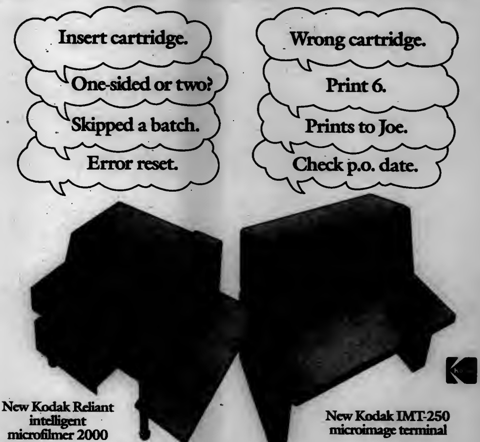
Storage and processing requirements will be minimal. They will be handled by a microcomputer, although the initial preprocessing of the summary data will be done by extraction routines on the mainframes, both central and remote. Transfer will involve shipping the summary data only.

Management requirements will include stringent provisions for data integrity and security. Initially, a high-level analysis of the executive's information needs will have to be performed, most likely using many of the techniques developed in expert systems research. Indeed, the advancement and spread of artificial intelligence and expert systems design methodologies will probably be most fully exploited in the commercial sphere in the creation of executive user interfaces. Ongoing consulting/programming assistance will also be required as information needs change.

Industrial. This will also be a relatively new group of users. It will include workers and supervisors in a wide variety of manufacturing-related roles. Typical applications include inventory control, production control, fault-testing, robotics, inspection, problem diagnosis and repair.

Processing will largely be done on the mainframe and will require a large amount of storage. Once again, expert systems technology will be useful here, as the relevant information about each failure/problem is captured and stored in the knowledge base, which in turn can be accessed and analyzed by problem processing systems. Even if this level of sophistication is not possible, a historical file of incidents will be maintained as a guide for appropriate





Insert cartridge.
One-sided or two?
Skipped a batch.
Error reset.
Wrong cartridge.
Print 6.
Prints to Joe.
Check p.o. date.

action. Transfer requirements will be negligible for the centralized manufacturing installation.

Management requirements are similar to those of the production information bases but with less stringent update protocols. Education of industrial users will be a key information management element, largely because this group of users has had far less exposure than clerical workers to computer equipment and possesses minimal keyboard skills. As a consequence, voice and image recognition capabilities will be the most important technical enhancement for hardware used in industrial settings.

Remote users

Office staff. Remote offices may be viewed as containing a smaller representation of each of the central site components. Many of the applications will (in fact, must) be identical to those at the central site. However, transfer of information will be a much more crucial element.

Processing will be handled largely by powerful (1M- to 2M-byte) microcomputers with hard disk storage capabilities. Selected data from these individual machines may then be loaded to a local minicomputer, that in turn will be linked via high-speed line to the central site mainframe. The sequence of the transfer process and the regulation of precisely which information will need to be forwarded on to other locations will be a key management issue.

Also, remote education and technical consulting capabilities will be required. Because of the expense and administrative problems associated with maintaining large training staffs in multiple locations, computer-based or computer-aided education will be the primary vehicle for providing expertise to the remote sites. The final management element will be decentralized network performance monitoring and problem diagnosis.

Field. One of the most interesting of the new classes of users will be personnel in field locations. The oil and gas industry, in particular, will need to support decision making at drill sites, off-shore oil platforms and producing fields. The construction industry will also see increased use of technology-supported test and inventory control activities in remote sites. Rugged, portable terminals capable of accessing specialized information bases will be increasingly evident.

Thus, a crew confronting an engineering problem could enter the indicators into the terminal and have that data analyzed by expert-systems software to get advice on how to proceed. The time-consuming and costly delays associated with tracking down a human expert to analyze the problem and then try to relay that information over the phone could be virtually eliminated.

Processing responsibilities will be shared between the portable terminals and the central or regional mainframe. Incremental storage requirements would be minimal since most of the transactions would be one-time or ad hoc in nature and would not require significant post-processing or analysis. The transfer element will be significant, probably involving the use of built-in modems and dial-up facilities. Again, depending upon how remote the field locations were, local-area network facilities might serve as the transfer medium.

The time-consuming, costly delays associated with tracking down an expert to analyze the problem and then trying to relay that information over the phone could be virtually eliminated.

The management issues would be security, the selection of appropriate network architectures and, of course, field training. Also, the physical maintenance of the machines themselves will have to be addressed.

Customers. Once again, this represents a relatively new group of users.

Banks, insurance companies, retail stores and other consumer-driven industries are realizing that to stay competitive in the '90s, they will have to reduce the labor component in the services they provide. Giving customers direct access to information bases is one major way to achieve this goal. Automatic teller machines, home banking, automated check-in terminals at car rental agencies, shopping at home via converter boxes on home TV sets — all of these will become widespread in the next few years, especially in major metropolitan areas.

This past February, IBM, Sears Roebuck & Co. and CBS, Inc. announced a joint venture to develop a nationwide commercial videotex service for households with computers. J.C. Penney, Citicorp and American Express have also expressed interest in this technology. One industry expert predicts that videotex could be a $30 billion industry by the mid-'90s.

Processing will take place largely on the mainframe, although there may be minimal intelligence at the node. Storage requirements may be quite significant, especially to hold large customer archive files. Information from these files will be intensely analyzed to support future marketing strategies and will constitute a major information asset.

SPSS inc.

Transfer will also be a significant and costly element, primarily because of the need for leased lines. Management issues will predominate. These issues will range from privacy and security concerns to backup, recovery and equipment repair to maintain stringent availability standards.

Telecommuters

This final major category will be the most diverse group of all. It will include permanent and part-time employees working at odd hours and accessing a wide range of information sources.

Sales. New technical developments will allow the traveling sales representative to achieve a higher level of communications sophistication. Portable computers will be used for everything from typing up the notes of a meeting to dialing up a home-office computer to demonstrate product features. The sales representative might also use a portable to call up needed information (such as current delivery schedules, price quotes, discount or financing options). Instead of leaving brochures, the representative might leave a complete, customized proposal.

These developments should help shorten the overall sales cycle and enhance the revenue-generating ability of a sales force. In addition, the portable terminal could transmit updated sales or forecast data directly to the home or regional office, thereby improving communications between management and its sales operatives. This development may also reduce the amount of clerical support required at field sales offices since contracts could be generated by computer as well.

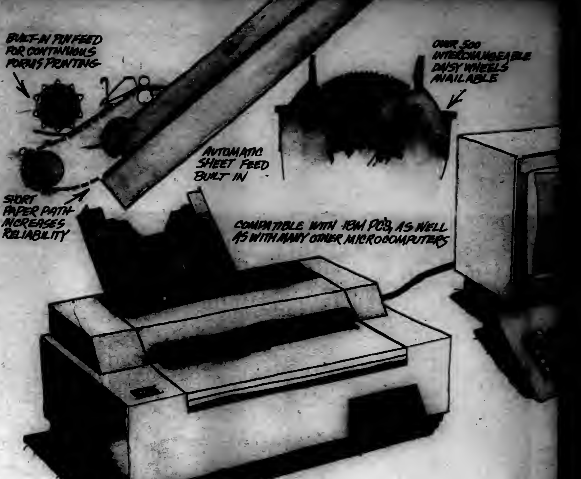
Cellular radio systems in large metropolitan areas will finally make car phones feasible, allowing sales representatives to stay in touch with their customer bases and significantly reducing telephone tag, which is frustrating and unproductive.

Word processing and financial analysis could probably be handled by the portables directly, with the more sophisticated demonstrations and inquiry processing handled by regional minicomputers or central-site mainframes. Storage requirements will be minimal. Transfer capabilities could be handled with a local-area network architecture or simple dial-up lines. The key management issues will, once again, be security (contract and pricing information is highly confidential), education and equipment maintenance.

Working parents. Two of the most interesting developments of the last decade have been the vastly increased number of mothers with careers and fathers who wish to play a more active role in the care and raising of children. By the end of the decade, it will be increasingly common to see one or both spouses working primarily from the home.

These working parents will largely be professionals, simply because executives are involved in too many meetings and other face-to-face activities to make telecommuting feasible. Industrial workers are still required to be physically situated in the production environment, and the costs of allowing clericals this work option will probably be viewed as prohibitive. However, the typical white-collar employee usually does a good deal of work in isolation and is far more likely to interact directly with an information base of some kind rather than numerous peers or higher-ups.

Programming, technical documentation, computer-aided authoring systems, financial modeling, credit and brokerage functions — all can be successfully carried out with a telephone and computer at home. The working parent could take care of household chores, dial up the mainframe and


BUILT-IN PIN FEED FOR CONTINUOUS FORMS PRINTING
OVER 500 INTERCHANGEABLE DAISY WHEELS AVAILABLE
AUTOMATIC SHEET FEED BUILT IN
SHORT PAPER PATH INCREASES RELIABILITY
COMPATIBLE WITH IBM PC'S, AS WELL AS WITH MANY OTHER MICROCOMPUTERS

The new IBM Wheelprinter: A simpler path to letter quality.

The new IBM Wheelprinter is a personal computer printer with a simplified approach to paper handling.

This new IBM personal printer is the only daisy wheel printer that offers both a built-in sheet feed and pin feed capability. It's the latest example of IBM's expertise in the design and manufacture of reliable paper feeds.

Because it has a paper tray capacity of 100 sheets, large jobs can be printed without reloading. And, at the flip of a switch, you can go from automatic to manual sheet feed.

The Wheelprinter prints quietly on plain paper, letterhead, multi-part forms and even envelopes at up to 25 characters per second. And you can easily attach it to IBM personal computers and to many other microcomputers.

The Wheelprinter is just one example of the more than 70 printer models we build. But they all serve a single purpose: To make your printing as effective as your processing. To give your work the finishing touch.

Contact your IBM marketing representative or call 1 800 IBM-2468, Ext. 90/3W, for the IBM Product Center or authorized IBM dealer nearest you.

IBM

IBM PRINTERS

The Finishing Touch

ask for information to be loaded to his micro and begin the day's analyses. Work might stop when the children return home from school and resume again after dinner. The resultant updated material could be placed in a file to be transmitted to the mainframe during off-peak hours (say, after Johnny Carson or at 7 a.m. while packing the school lunches).

Apart from improving productivity and employee morale, this option offers intriguing capacity management opportunities in terms of work scheduling. The important management issues will primarily be security and integrity of information bases, backup and recovery of home-based systems (what happens when the home hardware breaks down?), the enforcement of data standards and availability of help and consulting facilities to support the home user.

Consultants. One element in today's labor market that is drawing increased attention is the widespread use of consultants as a supplement to, or substitute for, permanent staff. The tremendous rise in the cost of benefit packages and of real estate, as well as an increasingly volatile economic situation, have forced many companies to look long and hard at personnel increases.

Consultants offer a corporation a great deal of flexibility in fulfilling short-term requirements or compensating for real or imagined inadequacies in staff training or capabilities. Complementing this corporate need is an increased entrepreneurial spirit among today's middle managers and senior analysts. These people are attracted by the financial and tax advantages, personal autonomy and growth opportunities that having one's own business presumably offers.

Consultants may not require office space, retirement plans or secretarial support. However, they will require access to corporate information bases. Indeed, the overwhelming part of a typical consultant's job (and, naturally, the biggest component of the fee) is data collection. Streamlining this task will not only allow more time to be spent on solid, site-specific analysis (too often missing from many final reports) but will also allow the client more frequent (perhaps daily) updates as to the contract's progress. Also, allowing the consultant to use client information resources and facilities may result in recommendations that are more feasible.

From an engineering standpoint, consultant processing, storage and transfer needs will be very similar to that of the working parent, although they will be more likely to require access to many different information bases and external time-shared services, depending on the nature of the task. Security and privacy will, once again, be key management issues, and stringent controls will have to be implemented to ensure the proper handling (and perhaps eventual destruction) of confidential information.

Industry trends, technological developments, government regulations, consumer attitudes — all of these are large unknowns. Yet all will affect working people. The challenge to the information engineer is to determine who those people will be, what they wish to do and how they can most productively do it with the best the technology has to offer.

About the author

Leilani Allen is assistant general manager of the Institute for Information Management in Sunnyvale, Calif. She teaches classes in information management in the U.S. and abroad.

MICROCOMPUTERS

DEC launches LN03 desktop laser printer

LAS VEGAS — Digital Equipment Corp. last week introduced a desktop laser printer that prints eight page/min and carries a $4,195 price tag.

DEC's LN03 can produce 300 dot/in. for text, twice the density of standard dot matrix printers, according to DEC. The LN03 also is said to produce simple business graphics with resolutions up to 150 dot/in.

Resident fonts allow the LN03 to print up to 120 char./line in the vertically aligned portrait mode and up to 150 char./line in horizontal landscape mode, according to the vendor. The printer's input cassette and output tray each hold up to 250 sheets of standard letter-size paper, DEC said.

The device is said to support both single-user and multiuser printing configurations. "A dedicated LN03 offers the single user the ability to add fonts by plugging in [read-only memory] cartridges," said Bruce Hunter, product marketing manager for DEC's Terminals Business Unit.

"When the LN03 is used as a shared resource, [random-access memory] cartridges are plugged in, and the host system down line loads fonts to the printer's expanded memory," he said.

The LN03 is driven by an on-board controller and has a serial interface with a selectable bit/sec rate of up to 19.2K, DEC said. The printer is said to be compatible with many applications written for DEC's LQP02, LA100 and LN01 printers.

Deliveries of the new desktop printers are scheduled to begin in February, according to the firm.

DEC is located in Maynard, Mass. 01754.

TI laptop, designed for mobile professionals, available soon

AUSTIN, Texas — Texas Instruments, Inc. last week introduced Pro-Lite, a 10¼-lb portable version of the TI Professional Computer, designed for mobile professionals and available in January for $2,995.

Pro-Lite reportedly features a 12-in. LCD with an 80-col. by 25-line display in text mode and a 640- by 200-pixel resolution (scrollable to 720 by 300 pixels) in graphics mode. Based on an 80C88 microprocessor (the Cmos version of Intel Corp.'s 8088), the Pro-Lite includes 256K bytes of random-access memory (RAM), expandable to 768K bytes; a 79-key, full-size keyboard; and a single 3½-in., 720K-byte microfloppy disk drive.

Pro-Lite runs under Microsoft Corp.'s MS-DOS 2.12. Approximately 30 packages will be available in microfloppy format in first-quarter 1985. These will include applications such as Ashton-Tate's Framework and Dbase-III, languages and vertical-market software, TI said. Other packages licensed on a single-user basis can be downloaded from a desktop Professional through a $75 interface cable, which also can transmit data files from IBM Personal Computers, according to the vendor.

The 768K-byte RAM capability, greater than that provided for most computers running MS-DOS, "will allow Pro-Lite to take advantage of future expert systems and natural language products," TI said.

A battery pack or second microfloppy disk drive, or both, can be added through an expansion box that plugs into the Pro-Lite's back, according to the vendor. The battery pack allows operation of up to five to eight hours and

See TI page 58

IBM-compatible Radio Shack micro bundled with application software

By Kathleen Sullivan
CW West Coast Bureau

FORT WORTH, Texas — Radio Shack Corp. a division of Tandy Corp., this month introduced the newest member of its Microsoft Corp. MS-DOS family of personal computers, the Tandy 1000, a floppy-disk-based system that includes bundled applications software.

The Tandy 1000, which uses the Intel Corp. 8088 microprocessor, is "close to 100% compatible with the IBM Personal Computer," said Ed Juge, director of market planning for Radio Shack.

The Tandy 1000's bundled applications packages, known as Deskmate, feature a variety of software programs, including text processing, spreadsheet, data base management, calendar and electronic mail.

Juge described the Deskmate ap-

See TANDY page 62

INSIDE

Current well-behaved packages leave user dreams unfulfilled

SMALL TALK
Eric Bender
CW Senior Editor

Today's "well-behaved" personal computer packages play by the rules of Microsoft Corp.'s MS-DOS, docilely going through the operating system every time. They're like well-behaved storybook children, running around everywhere and never getting messed up. They play on networks, in windows, in operating system environments and wherever else they please.

Among the drawbacks in this happy scenario, of course, well-behaved programs tend to be slow and not very interesting.

Best-selling packages such as Lotus Development Corp.'s 1-2-3 generally are ill-behaved Peter Pans rather than Wendys. They bypass the operating system to grab the hardware directly, achieving strong performance advantages.

However, you take your chances introducing them into a new environment. The most striking recent case is the host of best-selling IBM Personal Computer software that's not quite ready for prime time on the Personal Computer AT.

Things get further complicated, naturally enough, under new system software environments such as IBM's Topview or Digital Research, Inc.'s Graphics Environment Manager (GEM).

These new environments potentially offer users jazzy features such as mice, icons and windows and a lot of other benefits as well. And system software vendors say their goals include a way for applications developers to create well-behaved programs that run without modification on every MS-DOS machine, avoid paying any penalties in performance or functionality and benefit fully from the system software features.

But most application software vendors are wary about customizing their products. They are looking at multiple environments — Topview,

See BENDER page 62

Analyst says IBM's OA strategy augurs ill for marketplace rivals

By Edward Warner
CW Staff

BOSTON — Office automation consultant Amy D. Wohl thinks IBM's recent introduction of high-powered word processing software for its Personal Computer is "formidable," and that Apple Computer, Inc.'s "take-a-Macintosh-home" promotion will not generate sales to corporations.

Wohl expressed these thoughts during a speech and an interview at the East Coast Computerfaire, a personal computer show here this month.

Wohl, who operates Amy D. Wohl & Associates of Bala-Cynwyd, Pa., predicted that IBM's offering of Displaywrite III for the Personal Computer and Displaywrite 36 for its System 36 minicomputer, with smooth transfer of documents between the two systems, will make things tough for competitors, especially Wang Laboratories, Inc.

Wohl, however, said IBM has yet to offer the business graphics or project management software that she feels are needed by a well-rounded OA vendor. The firm, she added, does possess a competitive advantage in its Topview operating environment.

IBM's internally announced goal, she claimed, is "to own 65% of the Personal Computer market." The most likely way for them to do that, she continued, is by "making certain features that are very attractive only available to those who use its products."

A study by her firm, she noted, found that 88% of the corporations it surveyed required that their personal computers have Microsoft Corp. MS-DOS operating systems, for IBM Personal Computer compatibility. She added that 72% of the firms made IBM's PC-DOS an outright requirement, limiting purchases only to IBM equipment.

Apple Computer's Macintosh, currently being offered for overnight free trial to anyone holding a major credit card, has failed to crack the OA market, she claimed, because it lacks software.

The OA market is not closed to the arrival of a new vendor, she observed, adding that the likely candidate will be a Japanese firm marketing its hardware through the existing channels of an American vendor who is "product bankrupt, but has a strong distribution scheme."

Novell offers software for Netware local-area networks

OREM, Utah — Novell, Inc. has introduced Advanced Netware 1.0, local-area network operating system software that is said to support the use of multiple file servers on all Netware local-area networks and transparent bridges between these networks. It also reportedly has the ability to access special-function network servers.

Advanced Netware gives every user access to eight servers simultaneously, with storage capabilities up to 500M bytes per server, according to Novell.

Netware bridges essentially act as servers and communicate through a normal local-area network link, the vendor said. Reception and transmission are said to be completely transparent to the user.

The bridges reportedly also allow a personal computer to access the network from remote locations in either remote or local execution mode.

Remote execution "provides actual distributed processing by transferring applications programs and their data via modem for remote execution at the bridged personal computer," according to the company. This feature is said to give the remote personal computer all the capabilities of a local node. In local execution, only screen and keyboard information is transmitted to the remote personal computer, Novell said.

Using Novell documentation, managers can write the software necessary to accommodate special functions on a value-added server, and those functions will be fully integrated into the local-area network, according to the vendor.

Advanced Netware, which may be adapted to all Netware networks, is priced at $1,595 and will be delivered by January, Novell said.

Novell is located at 1170 N. Industrial Park Drive, Orem, Utah 84057.

TI from page 57

costs $129. The second disk drive is priced at $595, while the two options together carry a $724 price tag.

Internal option slots

A 300 bit/sec internal modem, priced at $300, is said to plug into one of the Pro-Lite's two internal option slots. The other slot can accept an RS-232 interface, an external monitor adapter or programmable read-only memory modules provided for specific applications, according to TI.

A 12-in. external monochrome monitor costs $325, while a color monitor is priced at $595. An optional 45-char./sec thermal transfer printer handles either plain or thermal paper and costs $499.

Initially, TI will sell the Pro-Lite through direct and value-added reseller channels.

More information is available from Texas Instruments Data Systems Group through P.O. Box 809063, Dallas, Texas 75380.

Data base program bows for IBM micros

CAMBRIDGE, Mass. — Infocom, Inc. has introduced a relational data base program for IBM Personal Computers said to be designed for nonprogrammers.

Cornerstone is designed for business professionals who need a data base for individual applications such as tracking sales leads, customer support and personnel management, Infocom said. According to the vendor, Cornerstone enables a nonprogrammer to create a data base by answering a series of simple questions.

The program is said to feature an interactive report writer that can draw information from any file or combination of files. It also allows users to add notes or comments to a file at any time, the vendor said.

Cornerstone includes a Help facility and an options feature, Infocom said. The options key shows the user exactly what to type next, whether it is a command, file name or item in the data base, the vendor said.

The program is available for the IBM Personal Computer, Personal Computer XT, Personal Computer AT and compatibles. It can be used in conjunction with packages such as Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar, as well as other spreadsheet and word processing programs. The price is $495.

Infocom is at 55 Wheeler St., Cambridge, Mass. 02138.

[redacted]

Orchid adds products to PCnet

FREMONT, Calif. — Orchid Technology has introduced several products for its PCnet local-area network for the IBM Personal Computers, including Lancomm, which reportedly allows dumb terminals on PCnet to function as intelligent workstations when linked with an IBM Personal Computer.

Lancomm reportedly allows Personal Computers on PCnet to support two dumb terminals simultaneously, with each terminal having full access to the network and its shared resources.

Also introduced for PCnet were PCnetmail, an electronic mail software package, and Command Spooler, a print spooler for the network, according to Orchid Technology.

PCnetmail reportedly offers store and forward functions and automatic remote networking communications. Command Spooler reportedly allows PCnet users to share one to three printers connected to their machines with other users or servers.

Prices for the products are: Lancomm, $395; PCnetmail, $695; and Command Spooler, $195.

For more information, Orchid Technology is located at 47790 Westinghouse Drive, Fremont, Calif. 94539.

MOTOROLA
Information Systems
MOTOROLA
Information Systems

SOFTWARE

BV ENGINEERING
PC Plot

BV Engineering has announced PC Plot, a graphing program that is said to create linear, semilogarithmic and full logarithmic plots in any combination of the X and Y axes.

PC Plot requires 64K bytes of memory and runs on microcomputers including the IBM Personal Computer, Zenith Data Systems Corp. 100 and 150, Corona Data Systems, Inc. Corona PC and on micros from Compaq Computer Corp. and Columbia Data Products, Inc.

The price for PC Plot is $62.95.

BV Engineering, Suite 207, 2200 Business Way, Riverside, Calif. 92501.

WARNER SOFTWARE, INC.
Desk Organizer

Warner Software, Inc. has announced that its Desk Organizer software is available for microcomputers running Microsoft Corp.'s MS-DOS operating system and for the Apple Computer, Inc. Macintosh.

Desk Organizer reportedly is used in filing, organizing notes, telephone dialing, writing and printing, calculating, transferring data and managing time.

The MS-DOS version will run on the IBM Personal Computer, Personal Computer XT, PCjr, Personal Computer AT and compatibles, the vendor said. The MS-DOS version requires a minimum of 95K bytes of random-access memory.

The price for the Macintosh version, scheduled for December shipment, is $149. Cost for the MS-DOS version is $195.

Warner Software, 666 Fifth Ave., New York, N.Y. 10103.

ADVANCED PRODUCTIVITY SOFTWARE
Executime

Advanced Productivity Software has announced an enhanced version of its Executime time management/scheduler program for the IBM Personal Computer AT, using either IBM's PC Xenix or IBM's PC-DOS 3.0 operating system.

Among enhancements in the new version is a Multiple Schedule File capability, which allows a single user to create many separate schedule files, the vendor said.

A Universal Search option is said to speed the user's access to a list of appointments and reminders that contain any user-defined name, word or symbol.

The Warning Notice feature reportedly alerts the user when a requested appointment time has already been scheduled.

The price for Executime for PC-DOS is $49.95; for Xenix, it is priced at $69.95.

Advanced Productivity, 2565 E. Chapman Ave., Fullerton, Calif. 92631.

See TOOLS page 64

Irma adapted to IBM's AT

NORCROSS, Ga. — Digital Communications Associates, Inc. has announced that its Irma micro-to-mainframe communications board has been adapted to the IBM Personal Computer AT.

Using Irma, the Personal Computer AT can emulate an IBM 3278 or 3279 terminal and transfer data to and from a mainframe while retaining its stand-alone capabilities, Digital Communications said.

The adaptation of Irma to the Personal Computer AT brings to the AT a host of software programs developed with the Irma board in mind, according to the company.

Irma for the IBM Personal Computer AT is priced at $1,195.

Digital Communications Associates is located at 303 Technology Park, Norcross, Ga. 30092.

BEHAVE from page 57

IBM's Virtual Device Interface (VDI), GEM, Microsoft Windows, Microsoft Networks and others — which may conflict with each other.

In the most spectacular example, Topview, the leading contender for widespread adoption, does not seem to be compatible with VDI or IBM's PC Network or much of anything else. Developers want to follow IBM's lead, but many are not quite sure what that means.

Until the dust clears on the requirements for the well-behaved packages of the future, many software developers will avoid committing themselves, and those impressive new environments may not mean much to users.

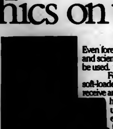
TANDY from page 57

plications as a set of "desk organizer" programs and said the bundled packages are not meant to compete with "full-blown" applications software.

The Tandy 1000, which comes with one floppy disk drive and a detachable keyboard, provides 128K bytes of random-access memory, expandable to 360K bytes, the company said. It is priced at $1,199, exclusive of the monitor.

The model features a three-voice sound generator and several built-in capabilities, including support for color and monochrome monitors, parallel printer port, joystick and light pen ports, according to the company.

Radio Shack is located at 1700 One Tandy Center, Fort Worth, Texas 76102.



IBM MAINFRAME
CONTROLLER
FORTE GRAPH
IBM PC

TOOLS

from page 62

SOFTWARE HOUSE
System 1032

Software House has introduced a version of its System 1032 data base management system for the Digital Equipment Corp. Microvax. System 1032 for the DEC Microvax reportedly is based on the System 1032 for DEC's VAX-11 minicomputers.

System 1032 did not require downscaling to run on the Microvax and contains the same features found in the VAX-11 version, the vendor said. Those features reportedly include user assistance, on-line documentation, full programming capabilities, host language interface, support for DEC's Decnet, data security and compiled procedures.

System 1032 for the Microvax is priced at $3,000 per CPU for those who already own a System 1032. Otherwise, it is priced at $8,000 for the first copy.

Software House, 1105 Massachusetts Ave., Cambridge, Mass. 02138.

COMPUTER SCIENCE INNOVATIONS, INC.
Software Design Language

Computer Science Innovations, Inc. has developed a software design language for use with the IBM Personal Computer and systems compatible with Microsoft Corp.'s MS-DOS operating system.

Software Design Language produces formatted design documents, the vendor said. The program reportedly can be used to design software at the system, process, module and algorithm levels. It is said to allow data items to be named and to support user-defined keywords.

A permanent license for the product costs $400.

Computer Science Innovations, P.O. Box 2628, Satellite Beach, Fla. 32937.

DATABASE DESIGN, INC.
Action Diagrammer

Database Design, inc. has introduced a software editor that runs on the IBM Personal Computer and compatibles.

Action Diagrammer is said to be based on a structured, graphics representation of the action comprising a software program as a hierarchy of bracketed blocks. Action diagrams reportedly can represent a high-level overview of a system and progressively decompose it to the level of executable code.

At the highest overview level, a program is pictured as single bracket. Fully expanded control flow and processing logic are grouped and bracketed in deeper levels of the hierarchy, the vendor said.

Action Diagrammer is said to supply control structure syntax in English, Cobol, PL/I, Fortran, C, Pascal and fourth-generation languages automatically. It reportedly enables the system designer to integrate modularity, hierarchical organization, control flow and structured logic constructs.

The package is priced at $495.

Database Design, 2020 Hogback Road, Ann Arbor, Mich. 48104.

ZONTEC, INC.
SPC Timesaver

Zontec, Inc. has introduced a color statistical process control (SPC) package that runs on the IBM Personal Computer.

SPC Timesaver is said to be an integrated system for the analysis, storage and display of SPC chart information. These charts reveal variations from norm, percentage, failures, trends, number of samples outside control and whether the process is capable of producing the desired results, the vendor said.

The program reportedly is able to maintain multiple sets of control limits within a single set of samples. Five main analysis functions are included: control charts, descriptive statistics and capability, tool wear and economic impact analysis.

SPC Timesaver will run on any IBM Personal Computer or compatible with 256K bytes of memory. A color graphics board is recommended by the vendor, although the program will reportedly work with a monochrome display. Price is $695.

Zontec, Suite 4135, 1329 E. Kemper Road, Cincinnati, Ohio 45246.

FUJITSU MICROELECTRONICS, INC.
Concurrent CP/M 86 for Micro 16S

Fujitsu Microelectronics, Inc. has announced that Digital Research, Inc.'s Concurrent CP/M 86 operating system is now available for Fujitsu's Micro 16S series of personal business computers.

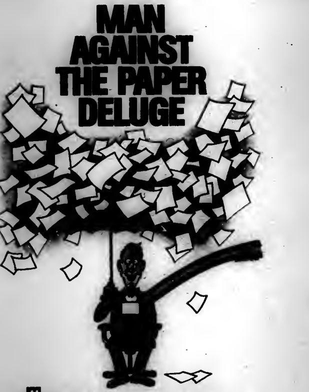
The multiuser Concurrent CP/M 86 operating system is said to enable Micro 16S and Micro 16SX computers to perform more than one computing task simultaneously and to support up to five external terminals.

As the main console, the Micro 16S can support four virtual consoles that can be accessed by pressing a designated combination of keys. The virtual consoles allow up to four programs to be active on the Micro 16S. While one program is being viewed, other programs can be completing tasks such as financial calculations in the background, the vendor said.

Concurrent CP/M 86 is priced at $200. A five-user configuration of the Micro 16SX system with a 13M-byte hard disk, 896 bytes of user random-access memory, controllers, color monitor and the multiuser operating system, excluding terminals and printer, is priced at $7,100.

Fujitsu Microelectronics, 3320 Scott Blvd., Santa Clara, Calif. 95051.

See TOOLS page 66



Q: How Many People Are Afraid Of Your 4-GL/DBMS?

A: None, If You Have EZNOMAD.

That's right. EZNOMAD is a major extension of NOMAD2 that pulls novice and infrequent end-users into the mainstream of mainframe computing. EZNOMAD's screen-driven environment requires no key words, system commands, or knowledge of syntax for operation.

With EZNOMAD, your end-users can sit back and follow a series of English-language instructions, menus, and pick-and-point screens. Now, those busy "management types" who "never have the time" to learn mainframe computing don't need to take the time. Infrequent users no longer need to "relearn" the system every couple of months.

EZNOMAD's micro-like capabilities access essentially all of the functions and power of NOMAD2. Imagine a senior manager in your company developing databases, creating applications, maintaining databases, and writing ad hoc reports — without your help.

Your senior management will not only be pleased with the capabilities of EZNOMAD, they will also be delighted with the cost of EZNOMAD—its's free to all NOMAD2 licensees.

In other words, you get the ease-of-use of a micro and the tremendous power and flexibility only a mainframe can deliver. And the price is right.

It's nice to know that when you pick NOMAD2 as the 4-GL/DBMS for your company, EVERYBODY will know first-hand that you've made the right choice.

EZNOMAD is the latest innovation in end-user computing from Dun & Bradstreet. NOMAD, now NOMAD2, has evolved over the years to keep pace with the demands for providing business professionals with maximum computing power. EZNOMAD is a major stride in that direction.

NOMAD2:
An Innovation In End-User Computing From Dun & Bradstreet

D&B Computing Services

a company of
The Dun & Bradstreet Corporation

For more information call: Roger Cox at (203) 762-2511. Or drop your business card into an envelope and mail it to Roger at: D&B Computing Services, 187 Danbury Road, Wilton, CT 06897.

NOMAD is a registered trademark of D&B Computing Services, Inc.

TOOLS

from page 64

DATAGRAPHIC SYSTEMS, INC.
CAD Master Version 2.0

Datagraphic Systems, Inc. has announced enhancements to its CAD Master, a computer-aided design (CAD) software package for the IBM Personal Computer line.

Among CAD Master's features reportedly are autodimensioning, autotolerancing, architectural dimensioning, curve fitting, filleting, mirror imaging and computation of volume and perimeter. Also included are a line and arc editor, a bill-of-materials function, data base extraction and a finite element preprocessor. Other features include "rubberbanding" of lines, arcs, circles and arrows.

CAD Master Version 2.0 is $1,795.

Datagraphic Systems, 9101 General Drive, Plymouth, Mich. 48170.

MICRO-SYSTEMS SOFTWARE, INC.
M-Edit

Micro-Systems Software, Inc. has introduced M-Edit, a tool for full screen editing on the IBM Personal Computer.

M-Edit reportedly offers word-processor-like functionality in as many as eight windows at once and also supports data transfer between windows. M-Edit includes block copy/block move functions. Each of the package's windows reportedly has a 64K-byte buffer and allows text lines of up to 240 char. to be created.

M-Edit is priced at $199.

Micro-Systems Software, 4301-18 Oak Circle, Boca Raton, Fla. 33431.

MITCHELL MANAGEMENT SYSTEMS, INC.
Quick-Plan

Mitchell Management Systems, Inc. has introduced its Quick-Plan project planning software for personal computers running under Microsoft Corp.'s MS-DOS operating system.

Quick-Plan reportedly builds project plans based on time, costs and resources using a series of menus written in English. It is said to offer editing and modeling capabilities and 13 different report formats.

Quick-Plan's four types of connectors and use of precedence diagramming reportedly allow it to handle 250 activities, 99 resources and 500 connectors for each project.

Quick-Plan is priced at $995.

Mitchell Management Systems, Westboro Office Park, 2000 W. Park Drive, Westboro, Mass. 01581.

PRIORITY SOFTWARE PACKAGING, INC.
Softcop

Priority Software Packaging, Inc. introduced a series of software protection programs said to guard against software piracy on micros utilizing IBM's PC-DOS, Digital Research, Inc.'s CP/M 86, Softech Microsystems, Inc.'s P-System and Apple Computer, Inc.'s Apple DOS.

Software Controlled Operating Protection (Softcop) is said to use a combination of validation and defense systems to provide security of protected software.

In a related announcement, Priority Software said it is now offering Softguard System's Superlok software protection program for IBM's PC-DOS applications through a licensing agreement with Softguard.

Softcop and Superlok are said to feature hard-disk support and authorized backup. According to the vendor, all forms of software can be protected with Superlok and Softcop, including templates and interpretive Basic programs. The protection programs are said to be self-executing and invisible to legitimate users of the protected software.

Software protection ranges in price from 10 cents to $1.50 per diskette. The actual cost depends on duplication quantities and the protection features required.

Priority Software Packaging, Unit A, 2730 S. Harbor Blvd., Santa Ana, Calif. 92704.

TEXAS INSTRUMENTS, INC.
Framework, Dbase III for TI Professional

Texas Instruments, Inc. has announced that Ashton-Tate's Framework and Dbase III packages will be available on the TI Professional in the first quarter of 1985.

Framework, an integrated software package, combines outlining, business graphics, data management, word processing, telecommunications, Microsoft Corp. MS-DOS access, spreadsheet capabilities and a programming language, TI said. The recommended configuration for a TI Professional includes 512K bytes of random-access memory and either two floppy disk drives or a Winchester disk drive.

Dbase III is a data base management system that features storage capacity of over 2G records per file (contingent on system hardware), 128 fields per data base and the ability to use 10 files simultaneously.

Each product will cost $695.

Texas Instruments, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

ENERTRONICS RESEARCH, INC.
Energraphics

Enertronics Research, Inc. has introduced Energraphics graphics software for the IBM Personal Computer.

Energraphics reportedly provides users with the ability to create and display or print line charts, pie charts and two- and three-dimensional bar charts. Also provided is the ability to produce maps, electronic circuit diagrams, mechanical and architectural drawings and surface diagrams, among other forms, Enertron-

Continued on page 68

CONDUCTOR: The MIS Approach to End-User Access

Today—end-users need greater access to data. And MIS needs better control. To solve both problems, TSI introduced CONDUCTOR.

CONDUCTOR lets end-users get the data they need. CONDUCTOR selects, manipulates and delivers data to any end-user environment. Without programming. And CONDUCTOR gives MIS more control than ever over quality and integrity, with a new degree of security.

While others have tried to solve the end-user problem, they've only addressed a small part. CONDUCTOR goes for the big picture. So remarkably different, there's virtually nothing else like it.

CONDUCTOR is the latest innovation in software from Dun & Bradstreet. As such, it joins NOMAD, now NOMAD2, the premier 4-GL/DBMS from D&B Computing Services, and DunsPlus, the "people literate" microcomputer that reflects the way you do business.

Find out about TSI's CONDUCTOR today. We're sure you'll like the way it helps you CONDUCT business.

TSI International:
Innovations In Managing End-User Computing From Dun & Bradstreet

TSI International

a company of
The Dun & Bradstreet Corporation

For the facts on CONDUCTOR, call 1-800-227-3800, Ext. 7005 or drop your business card into an envelope and mail it to Marketing Service, TSI International,
187 Danbury Road, Wilton, Connecticut 06897.

NOMAD is a registered trademark of D&B Computing Services, Inc. DunsPlus is a trademark of DunsPlus, a company of The Dun & Bradstreet Corporation.

MICROCOMPUTERS

Continued from page 66

ics said.

Energraphics reportedly offers interactive operation and supports color and monochrome displays and several dot matrix printers.

Energraphics is priced at $350.

Enertronics Research, Suite 207, 150 N. Meramec, St. Louis, Mo. 63105.

SCIENCE MANAGEMENT CORP.

Thoroughbred

Science Management Corp. has introduced its Thoroughbred multiuser operating system (TB/OS) for the IBM Personal Computer AT.

The operating system reportedly upgrades the AT to a three-user system that can run more than one application simultaneously. TB/OS also reportedly operates in connection with standard Personal Computer AT hardware and does not require custom boards for the upgrade to multiuser status.

TB/OS does not interact with either PC Xenix or PC-DOS, both announced for the AT by IBM, the vendor said.

TB/OS is priced at $795.

Science Management, 1011 Rt. 22 W., Bridgewater, N.J. 08807.

TEXAS INSTRUMENTS, INC.

Natural Link

Texas Instruments, Inc. has announced Natural Link software packages, which permit TI Professional Computer users to interact with popular software programs using simple English commands.

The 10 packages reportedly translate user-constructed English sentences into commands that the underlying software package will recognize. The same Natural Link format is followed in each application package, giving users a familiar interface for all Natural Link programs, TI said.

The Natural Link programs are configured for Microsoft Corp.'s MS-DOS 2.1 operating system and nine application programs: Multimate, from Multimate International Corp.; Wordstar, from Micropro International Corp.; BPS Business Graphics, from Business Professional Software, Inc.; Supercalc 3 and Easywriter II, from Sorcim/Information Unlimited Software; Dbase III, from Ashton-Tate; Peachtext 5000, from Peachtree Software, Inc.; Microsoft's Multiplan; and Microrim, Inc.'s R:Base 4000 series.

Natural Link Access to MS-DOS requires a TI Professional or Portable Professional with MS-DOS 2.1 and at least 256K bytes of random-access memory (RAM). Natural Link Commands products require MS-DOS 2.1, 512K bytes of RAM and a Winchester disk drive.

Natural Link Access to MS-DOS costs $75. Natural Link Command programs for the above applications are priced at $125 each, the vendor said.

Texas Instruments, Data Systems Group, P.O. Box 809063, Dallas, Texas 75380.

SYSTEMS

MOLECULAR COMPUTER, INC.

Molecular Series 36

Molecular Computer, Inc. has introduced the Series 36, a multiprocessor system said to provide each user with one or more dedicated personal computers through individual application processors.

All processors and peripherals for all users are contained within the Series 36's systems cabinet. The cabinet reportedly contains slots for up to 36 application processors, both 5¼-in. and 8-in. floppy disk drives, a Winchester disk drive and an optional cartridge tape drive.

Each user's application processor is interconnected to all others by the vendor's M/Bus interprocessors link, which also provides high-speed access to shared disks, printers and other peripherals, the vendor said.

Molecular's N/Star network operating system software is said to provide the ability to share data files and is compatible with Digital Research, Inc.'s CP/M 80 and CP/M 86.

The combination of the M/Bus and N/Star is said to provide the equivalent of a local-area network within the systems cabinet.

Price is $21,995 without tape backup and $23,995 with disk drive.

Molecular Computer, 251 River Oaks Pkwy., San Jose, Calif. 95134.

WICAT SYSTEMS, INC.
System 2220; Wicat Interactive Terminal

Wicat Systems, Inc. has introduced its System 2220 and its Wicat Interactive Terminals (WIT).

A rack-mounted unit said to offer 1M byte to 12M bytes of random-access memory (RAM), the System 2220 reportedly supports from one to 64 users and features a 12.5-MHz Motorola, Inc. 68000 central processing unit, a 4K-byte cache memory system and zero wait states.

The WIT is said to be an intelligent color graphics terminal offering a video interface option.

The WIT also includes a 12.5-MHz Motorola 68000 microprocessor with zero wait states and 256K bytes of downloadable RAM, according to the vendor.

It also includes commands for high-speed graphics operation and audio capabilities, Wicat Systems said.

The System 2220 is priced starting at $40,720, including the central processing unit, an 80M-byte disk and a 17M-byte, ¼-in. tape cartridge storage unit.

The WIT is priced starting at $7,275, including the video option.

Wicat Systems, P.O. Box 539, 1875 S. State, Orem, Utah 84057.

COMMUNICATIONS

SOPHIA COMPUTER SYSTEMS, INC.
Link for IBM Personal Computer and SA700 emulators

Sophia Computers Systems, Inc. has announced a serial communication link for the IBM Personal Computer said to allow users to download microprocessor software developed on the Personal Computer XT to Sophia's in-circuit emulators.

The link supports file transfer from the Personal Computer XT to Sophia's SA700 in-circuit emulators, used for troubleshooting. Any Microsoft Corp. MS-DOS or IBM PC-DOS system can function as a development host, the company said.

The price for the Personal Computer link is $495.

Sophia Computer Systems, 3337 Kifer Road, Santa Clara, Calif. 95051.

CXI, INC.
3270 and 3278/79 IBM Personal Computer connections

CXI, Inc. has announced that its 3270 IBM Personal Computer connections and 3278/79 IBM Personal Computer connections are compatible with the Personal Computer AT under IBM's PC-DOS 3.0 and 3.1.

The connection products reportedly allow users to have from one to five host sessions, a PC-DOS session and two notepads displayed on screen simultaneously.

The CXI 3270 Personal Computer connections reportedly are available either as coaxial or modem connections and provide IBM 3270 emulation.

The 3270 Personal Computer coaxial and modem connections are $1,595 each. The 3278/79 Personal Computer coaxial and modem connections are $1,145 each.

CXI, 3606 W. Bayshore Road, Palo Alto, Calif. 94303.

See TALK page 71

SYSTEM 2000® DBMS. WHEN YOU BOUGHT IT FIVE YEARS AGO, THEY THOUGHT YOU WERE SMART. TURNS OUT YOU WERE A GENIUS.

In the beginning, you bought your SYSTEM 2000 DBMS because it was the best anywhere.

You also figured Intel simply wouldn't be able to leave well enough alone.

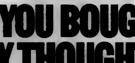
You were right.

And, thanks to a continuing program of product enhancements, our DBMS keeps getting better and better.

While you keep looking smarter and smarter.

Now, in addition to all of our previous improvements, the SYSTEM 2000 DBMS also offers Relational Database Access (RDBA).

RDBA is an enhancement of our system's query and report languages which gives relational access to multiple databases. Which, in turn, enables users to greatly reduce programming time, perform database modeling and engage in "what if" analyses. Some very noteworthy user benefits in anybody's book.



The SYSTEM 2000 DBMS offers a powerful set of integrated functions. The result is the broadest and deepest functionality of any DBMS.

It all adds up to the broadest, deepest functionality of any DBMS anywhere.

The kind of functionality that allows virtually any pc to share data with virtually any mainframe. We call it the Data Pipeline™ system.

The ingenious SYSTEM 2000 DBMS.

Backed by a billion-dollar-plus, technologically-renowned company which continues to support each and every SYSTEM 2000 DBMS with complete training, documentation and hotline services.

If you don't already have our SYSTEM 2000 DBMS working to keep you looking smarter, call us today at (800) 538-1876. In California, call (800) 672-1833.

Or write: Intel, Lit. Dept. H21, 3065 Bowers Ave., Santa Clara, CA 95051.

There's still time to go to the head of the class.

intel

TALK

from page 69

FORTE DATA SYSTEMS
Fortegraph and Forte 3270 PC

Forte Data Systems has announced that its Fortegraph software and board package is compatible with the Irma communications board from Digital Communications Associates, Inc. It also introduced its Forte 3270 PC for the IBM Personal Computer.

Fortegraph, running in conjunction with the Irma emulator for the IBM 3278/79 terminal, reportedly provides mainframe graphics capabilities to the Personal Computer. It also allows the Personal Computer to function as an IBM color graphics terminal and offers emulation of the IBM 3279 Model S3G color graphics terminal with programmed symbols, according to the vendor.

Forte 3270 PC reportedly allows the Personal Computer to gain the functions of an IBM 3270 workstation.

Forte 3270 PC is priced at $1,495. Fortegraph with Irma compatibility is priced at $1,595.

Forte Data Systems, 2205 Fortune Drive, San Jose, Calif. 95131.

STORAGE

PERCOM DATA CORP.
Superior Interior

Percom Data Corp. has introduced its Superior Interior 22M-byte, half-height disk storage system for the IBM Personal Computer.

The Superior Interior reportedly mounts in the second drive position of a Personal Computer, giving users internal floppy and hard-disk capability.

The disk storage system reportedly has a height of 5¼-in., a step time of 3 msec and a data transfer rate of 5M bit/sec.

It includes a soft-start motor and filtering system to reduce electronic noise, Percom said.

The Superior Interior is priced at $2,195.

Percom Data, 11220 Pagemill Road, Dallas, Texas 75243.

COGITO SYSTEMS CORP.
PT925 enhancement

Cogito Systems Corp. has enhanced its 25M-byte, half-height Winchester disk drive to provide a reported 37% increase in speed.

The enhanced PT925 features 25M bytes on two platters, using all four surfaces for storing data, according to Cogito Systems.

It also offers a dedicated head landing zone and three-axis shock mounts, said to be effective up to 40 g forces.

It also is said to include a band-driven stepper motor actuator operating in an open loop linear mode to achieve access time of less than 85 msec.

The drive is priced at $795, the vendor said.

Cogito Systems, 235 Zanker Road, San Jose, Calif. 95131.

PRINTERS/PLOTTERS/ PERIPHERALS

EXXON OFFICE SYSTEMS CO.
Exxon Ink Jet Printer

Exxon Office Systems Co. announced that its ink jet printer can now be used with the IBM Personal Computer and Personal Computer XT for high-resolution printing of graphics and text.

The Exxon Ink Jet Printer uses device driver software that is inserted into the operating system of the Personal Computer or Personal Computer XT. The printer is said to produce correspondence-quality print in a variety of type styles.

Users can choose to install up to eight resident fonts from a selection of more than 20 type styles, the vendor said. The device driver is said to permit the unit to print output from personal computer applications at speeds up to 90 char./sec.

Prices for the printer begin at $2,995. The device driver software costs an additional $95.

Exxon Office Systems, 777 Long Ridge Road, Stamford, Conn. 06902.

BOARD-LEVEL DEVICES

THESYS MEMORY PRODUCTS CORP.
Fastfile

Thesys Memory Products Corp. has announced the Fastfile semiconductor memory system, featuring an access time of less than 0.25 msec and a data transfer rate of up to 1M byte/sec.

Fastfile has a built-in uninterruptible power supply and uses 256K-byte semiconductor memory chips. The chips feature single-bit error correction and double-bit error correction with parity checking on internal data transfers.

The product is intended to work in local-area networks and multiuser applications where it can reduce disk access time and the frequency of disk access, the company said.

The price for the 1.5M-byte storage capacity version of Fastfile is $1,795, and the price for the 5M-byte version is $3,495, according to the company.

Thesys Memory Products, 7345 E. Acoma Drive, Scottsdale, Ariz. 85260.

AST RESEARCH, INC.
Preview!

AST Research, Inc. has introduced Preview!, a monochrome display adapter board for the IBM Personal Computer, Personal Computer AT and Personal Computer XT.

Preview! reportedly offers bit-mapped graphics compatible with several business software packages, including Ashton-Tate's Framework and Lotus Development Corp.'s Symphony and 1-2-3.

Preview! is priced at $399, the vendor said.

AST Research, 2121 Alton Ave., Irvine, Calif. 92714.

COMPUTER INDUSTRY

STC third-quarter report details losses

LOUISVILLE, Colo. — Storage Technology Corp. (STC) posted a third-quarter loss of $64.7 million, according to its recently released financial report. The company's anticipation of that loss had earlier led it to file for protection under Chapter 11 of the Federal Bankruptcy Act.

The loss for the quarter, equal to $1.87 per fully diluted share, compared to a year-earlier loss of $6.9 million, or 20 cents per fully diluted share. For the first nine months of the current fiscal year, STC posted a loss of $86.2 million, or $2.49 per share; that figure included a tax benefit of $24.3 million. The company had reported a quarterly loss of $5.4 million, or 5 cents per share, in the comparable period in 1983.

STC actually posted a revenue gain for the third quarter, $282.2 million, compared to year-earlier revenues of $201.4 million; however, costs and expenses soared to $282.2 million, compared to $212.5 million in the third quarter last year. For the first nine months, revenues declined to $656.6 million, compared to $659.6 million last year, and expenses increased to $767.2 million from $664.6 million the previous year.

The third-quarter loss was compounded by federal tax adjustments for the years 1977 and 1978, the company said. Despite a pretax loss of $52.5 million, the company paid income taxes of $12.4 million.

Lower than expected shipments

STC attributed the financial problems to lower than anticipated shipments, higher costs for new products, lower margins due to price cutting and increased depreciation expenses on rental equipment.

Additionally, the company said that it had placed its Dublin subsidiary, Storage Technology Products B.V., into receivership. That subsidiary, employing 363 people and engaged in manufacturing products for the European market, was acquired in 1980 as part of the acquisition of Documation, Inc. STC said its facilities in the U.S. and Puerto Rico would supply the market formerly served by the Irish subsidiary.

Prior to the release of the financial report, STC Chairman Jesse I. Aweida met with company creditors and U.S. trustee Dolores Kopel. Aweida pledged the company's full cooperation and desire "to emerge from Chapter 11 as rapidly as possible with a reorganization plan acceptable to

See STC page 86

■ Pansophic Systems, Inc. took aim at gaining a foothold in the high-end IBM mainframe software market with the recent acquisition of the developer of an on-line application generator/78

■ Control Data Corp. announced its intention to sell off a financial subsidiary and focus more on the computer industry/80

■ Lee Data Corp. will acquire Visual Technology, Inc., manufacturer of the Commuter portable computer, in a $16.8 million deal/80

INDUSTRY INSIGHT
David Olmos
CW Staff

Trade secret suits devastate firms

While not all trade secret lawsuits make splashy headlines like last year's IBM-Hitachi Ltd. case, such legal battles are being waged throughout the computer industry at terrific cost to the combatants. In some instances, the very survival of a company may be at stake.

Eagle Computer, Inc. and Franklin Computer Corp. are two recent cases in point. Eagle, a maker of IBM-compatible microcomputers, has been struggling to stay afloat ever since IBM slapped it with a patent infringement suit early this year. And Franklin, burdened by a $2.5 million settlement of a copyright infringement suit brought by Apple Computer, Inc., was forced into a Chapter 11 bankruptcy reor-

See SECRETS page 84

Xerox computer chief targets top of factory automation heap

By Kathleen Burton
CW West Coast Bureau

LOS ANGELES — Xerox Computer Services (XCS) President William Fello believes his profitable $100-million division of the Xerox Corp. will garner the lion's share of the lucrative factory automation software market by 1987.

Fello, who took over as XCS' president in April after serving as marketing vice-president, plans rapid growth for the division. Over the next two years, he will integrate Xerox office products with Xerox business systems products and increasingly target vertical markets. "By 1987, vertical software will be more profitable than our services, accounting for half our sales," he said.

XCS' first commercial product, a turnkey manufacturing system called the Xerox Business Management System (XBMS), was introduced last March. It is available on the IBM 4331, the IBM 308 mainframe and the IBM Personal Computer XT. The system's 23 business and manufacturing programs include decision support, computer-aided design/computer-aided manufacturing, engineering, manufacturing control, factory automation tools and a microcomputer-to-mainframe link.

The potential customer base for computer-based manufacturing tools is enormous, according to Fello. Only 5% of the nation's 45,000 small factories producing less than $10 million worth of goods annually have automated their businesses so far. "Most manufacturing plants in the U.S. are still untouched by computers, so computer-based manufacturing is still wide-open territory," he said.

Fello predicted that IBM would not challenge XCS' two-year lead in factory automation software. "IBM's a tough competitor," he said, "but both companies can coexist in this niche." According to Fello,

See XEROX page 88

In face of redoubled market competition, Cray boss optimistic

By Charles Babcock
CW New York Bureau

NEW YORK — Cray Research, Inc. Chairman John A. Rollwagen recently declared that his company will maintain its lead in supercomputers despite competition from the Japanese or possibly even IBM.

Two Japanese companies, Fujitsu Ltd. and Hitachi Ltd., have introduced their own supercomputers, but "there's nothing happening there that's going to knock us off the track," Rollwagen told the New York Society of Security Analysts recently.

"Cray has the lead at the moment, but it's a thin one. It can't afford to fail on one of its next-generation machines," said James C. Browne, professor of computer science at the University of Texas at Austin and chairman of a panel advising the U.S. Office of Science and Technology Policy on supercomputers.

Cray has the lead in producing multiprocessor supercomputers; the Japanese models are still single processor units, said Jack Worlton, a fellow at the Los Alamos National Laboratory, Los Alamos, N.M., who has evaluated tests of the Cray and the Japanese computers. He said the contest is a three-way race between competing technologies — emitter-coupled logic (ECL), gallium arsenide and Cmos semiconductor chips — and which one will win is not clear.

While IBM has not indicated that it will enter the race, Rollwagen's comments reflected concern that it will. About half of Cray's units go into IBM sites, and users transfer some of their engineering and research applications to the Cray machine. This delays the customer's need to upgrade his IBM mainframe, Rollwagen noted.

To stop this "leakage" of mainframe sales, IBM might be tempted to enhance its still-unannounced Sierra line or even offer its own supercomputer, Rollwagen said. "Cray is a tiny company, and I'd never say we can handle IBM. But if they come over to our turf, we'd give them a hell of a fight," he said.

Browne said the Hitachi and Fujitsu supercomputers are IBM-compatible, which puts pressure on IBM to enter the field. IBM cannot wait five or six years to develop its own entry if it finds Japanese units going into its customer sites, he added.

When the Cray-2 becomes available, the Minneapolis manufacturer will have the Japanese bracketed with high-performance, low-cost machines, Rollwagen added.

Half of Cray's components are supplied by Fujitsu; Rollwagen said his company assumes that any information they provide to Fujitsu's semiconductor division ends up in the hands of Fujitsu's computer division.

"Fujitsu tells us no, that is not so, that we are a valued customer," he told the security analysts. He said Cray officials have seen components in the Fujitsu VP 200 that they cannot buy from Fujitsu.

See CRAY page 83

One of the smartest reasons to buy Digital
Digital Service.

From the moment you choose Digital, our service organization goes to work to protect your investment. We'll develop your software applications. Train your employees. Keep your system up and running. We're ready to provide the support you need, whether you are running a single system or a large network of systems. Our engineers have even worked alongside customers to build new computer sites with the proper power, air conditioning, and fire protection. From start to finish, Digital Service is a smart decision.

Our people help your people develop the skills they need to get the most out of your Digital computer. We offer more than 500 courses on hardware, software, and office automation. At Digital's worldwide Training Centers. Or at your location. And, at your request, we will even customize training to meet your special needs.

Because no other business is like yours, Digital's software experts help you select the right applications for your business. Or they tailor programs to fit the way you work. And whenever you need the answer to a question or problem, specialists trained in your software applications are only a phone call away.

You select the level of service you need: whether you need on-site hardware support 24 hours a day, seven days a week, with our unique commitment to when service will begin, or the economy of carry-in or mail-in services. Digital gives you a choice.

Digital has over 20,000 service professionals worldwide to give you peace of mind with fast, personalized service. And we deliver that service when and where you need it. That's why Digital Service is the smart choice.

Digital Service is everywhere, because Digital's customers are everywhere. Our specialists regularly service Digital's systems on remote islands. On board ships. Even at the South Pole.

For more reasons to buy Digital Service, call 1-800-DIGITAL.

digital™

High-tech industry needs to address Tax Reform Act;

OUTSIDE LINES
A.D. Saunders

Congress' approach to the Tax Reform Act of 1984 reveals major problems that must be addressed by the high-technology community.

First, on the issue of compensation and benefits, the act says a lot about too little and thereby makes compliance difficult because of the paperwork involved. Second, what the act does say often conflicts with other government policies designed to strengthen the ability of U.S. companies to compete on a global scale; and third, the act says nothing about software development accounting when something should have been said.

So many changes have been made that many high-technology companies will find it necessary to go back to the beginning and review all of their benefits via an audit. The crux of compensation and benefits tax policy is whether a benefit will be included as income to the employee or whether it will be deductible by the company as a business expense. Only an audit can pin down what is taxable or deductible and what is not: store discounts, tax preparation services for employees, dining and exercise facilities, parking, tuition reimbursement and the so-called cafeteria plans (which are not related to eating).

Another consideration in evaluating the impact of tax changes in compensation and benefits is whether the benefit is available to all employees or whether it is limited to key employees. The Tax Reform Act tends to favor democracy, so generally speaking, benefits available to all result in no tax to the employee. Certain perks which are usually restricted to senior personnel, such as interest-free loans and stock options, took a beating.

For example, under the old law, a portion of income from the exercise of incentive stock options is ordinary income, and a portion is capital gain. The new law increases the ordinary income amount for these stock options because, as Julia Bell, a tax lawyer with Gaston Snow & Eli Bartlett in Boston pointed out, although the long-term capital gain holding period was decreased in the Tax Reform Act generally, it was not decreased in the area of incentive stock options.

We hear so much adverse commentary about management compensation that we often overlook its real purpose: to attract top-flight people and reward their performance over time. in the high-technology world, being able to compete is as much a function of people as it is finances. Bill Bowman, chairman of Spinnaker Software of Cambridge, Mass., pointed out that a major obstacle has been that Congress "has no idea that stock options are as important and as widely used by small new companies" as they are by large companies like IBM.

Bowman testified at Congress' Joint Economic Committee's hearings and confirmed the fact that some members of Congress were thoroughly ignorant of the industry's views. Hopefully, Bowman said, the hearings will help revamp Congress' piecemeal approach and let them know that "stock options are an important way of life to smaller companies."

A golden parachute is a contract "to provide payments, contingent on a corporate takeover, often equal to several years compensation . . . [which are] deducted by the company as ordinary and necessary business expenses," according to an Ernst & Whinney (E&W) analysis of the Tax Reform Act of 1984.

Saunders is a Boston-based attorney with a practice which includes international marketing, antitrust issues and corporate finance.

benefits, foreign tax, accounting issues raise concerns

According to E&W, excessive payments are now "presumed to constitute unreasonable compensation and are not deductible by the company. In addition, such payments are subject to [Federal Insurance Contributions Act] taxes, and a 20% nondeductible excise tax is imposed on the recipient."

There has been some talk of restructuring the golden parachute as a covenant not to compete. The payment would be for not doing something contrary to the competitive interests of the company as opposed to actually doing something for the company. The language of the Tax Reform Act makes the present value of the payment the test and not how that payment is otherwise characterized. So it is back to the drawing board for golden parachutes.

The Domestic International Sales Corp. (Disc) has new clothes. It is now called the Foreign Sales Corp. (FSC). The previously deferred Disc income, which would have been taxable under the old law at some unspecified time in the future, has been forgiven and becomes a permanent benefit to the tune of between $8 billion and $13 billion, according to George Yost of Coopers & Lybrand, Inc. The problem of the FSC is whether software will qualify as an export property for FSC purposes.

The new rules on withholding should help U.S. companies (and the U.S. Department of the Treasury) raise capital overseas. They obviate the need for international finance subsidiaries which were often incorporated in the Netherlands Antilles by U.S. companies as a way around the withholding problem. The withholding provision, however, has not come without its own baggage. Securities, bonds and other financial obligations purchased by foreigners are to be in "bearer" rather than "registered" form. The difference is important because of the anonomity they provide. The U.S. Senate feared losses to the public purse, believing only registered obligations, such as ones with the owner's names on them, could prevent tax evasion. The Treasury was in a quandary about what to do, but decided in late August to require money managers to certify that no purchaser is a U.S. citizen or resident. Bearer obligations stand, at least for now.

One of the very complex issues which international tax lawyers face is to determine whether the source of income is U.S. or foreign. If the income is U.S., then U.S. rates apply, but if the source is foreign, the company gets a credit against its U.S. taxes for payment of the foreign source income toward U.S. source income. The rules relating to these issues continue to "put U.S. companies at a competitive disadvantage" according to Jim Giarruso, Computervision Corp.'s vice-president for taxes.

Consider the transfer of intellectual property such as software to foreign subsidiaries. The Internal Revenue Service must now treat that transfer as a sale and will impose a tax. As Rob Langer, treasurer of Lotus Development Corp. pointed out, it was possible for many years to get an IRS ruling allowing the transfer to be tax free, but that route is "out the window now." The provision also has the potential for inflicting a significant tax liability. Since the transfer is a sale, whether or not there is profit, some corporate treasurers can outline a horrific red scenario in which up to a fourfold tax liability occurs as a result of the transfer.

Pansophic buys out Christensen, acquires Telon

By David Olmos
CW Staff

BOSTON — Pansophic Systems, Inc. completed an acquisition earlier this month aimed at helping the company gain a foothold in the high-end IBM mainframe software market.

On Nov. 1, Pansophic acquired the remaining 85% of the assets of Christensen Systems, Inc. which it did not already own. Christensen, a three-year-old Quincy, Mass., software company, is the developer of Telon, an on-line application development program designed for IBM IMS-DC and CICS operating environments.

Pansophic, a $53-million system software supplier based in Oak Brook, Ill., until now, had no product targeted at the high-end IBM customer. The company hopes the Telon product will enable it to establish a strong position in large IBM shops.

Christensen

David Eskra, Pansophic president and chief operating officer, in a recent interview here said the company wants to gain a foothold in 8,000 to 12,000 of the estimated 33,000 IBM mainframe installations worldwide. Pansophic claimed its present customer base numbers 7,600.

"Telon will elevate Pansophic's reputation in those big IBM shops and will help us sell products at all levels of IBM shops," Eskra maintained. "It allows us to have a more consistent strategy at the customer level, and it allows customers to buy more than one Pansophic product at a time."

"We want to be the market leader," said Alfred Seyler, Pansophic's vice-president and managing director of on-line products. Seyler claimed that no clear market leader has yet emerged in the IBM IMS-DC and CICS arena, in which companies like Informatics General Corp., Cincom Systems, Inc. and Oxford Software Corp. are the major players.

"We fully intend to dominate that market and to dominate it quickly," Seyler asserted.

Eskra

Telon sells for about $100,000, or about twice as much as any previous product in the Pansophic line. Because Telon poses a different kind of marketing challenge, Eskra said, Pansophic, which has a worldwide sales force of 105 people, plans to establish a separate U.S. sales force for the product.

According to Don Christensen, founder and president of Christensen Systems, Telon had been installed at 37 IMS sites, accounting for sales of about $3 million prior to the acquisition. Christensen explained in an interview that his company has been weak in the marketing area and that it lacked the extensive marketing channels a major company like Pansophic can offer.

Eskra said the company plans to continue to expand its product line through acquisitions, while at the same time, placing increased emphasis on in-house research and development.

Last April, Pansophic paid $500,000 to acquire a 15% interest in Christensen Systems. It decided to exercise its option to acquire the remainder of the company for $2 million. As part of the deal, Christensen will also receive royalties for the sale of its products during the next five years.

The acquisition provides that all Christensen personnel will retain their present positions and responsibilities.

CEC to market S1 to Japanese

LAWRENCEVILLE, N.J. — Multi Solutions, Inc. announced recently it had entered into an exclusive five-year agreement with Computer Engineering and Consulting Ltd. (CEC) of Tokyo, for the licensing and distribution of Multi Solutions' S1 operating system to Japanese companies.

Subject to the approval of the Japanese government, the agreement provides that CEC must pay Multi Solutions minimum royalties amounting to about $40 million to maintain the exclusive worldwide rights to license and distribute the operating system and all related products to Japanese computer manufacturers, software designers and other vendors. Multi Solutions said CEC may renew the agreement for an additional five years, in which case CEC must pay additional minimum royalties of approximately $20 million a year for each of the five years.

The S1 operating system is a multiuser, multitasking system said to be capable of operating on almost any computer hardware.

Comdisco reports year-end plunge in profits, posts record revenues

ROSEMONT, Ill. — Computer leasing and brokerage company Comdisco, Inc. recently reported profits of $29.7 million, or $1.05 per share, for the year ended Sept. 30. Year-earlier profits were $51.8 million, or $1.78 per share.

The company said the decline in profits was primarily due to decreased volumes of tax-advantaged transactions, which were suspended during an Internal Revenue Service investigation that was concluded early this year without adverse action being taken. In fiscal year 1982, the company reported profits of $29.3 million.

Despite the IRS review, Comdisco reported record revenues of $558.3 million for the year just ended, compared with $543.1 million last year.

For the fourth quarter of the year just ended, Comdisco reported profits of $8.9 million, or 33 cents per share, compared with year-earlier profits of $15.7 million, or 53 cents per share. Fourth-quarter revenues were $142.6 million, compared with $141.8 million in the previous year.

Kenneth N. Pontikes, chairman and president of Comdisco, said the company "expects a strong resurgence in financial services activities in fiscal 1985."

Data Access reorganization completed under Chapter 11

BLACKWOOD, N.J. — Data Access Systems, Inc., an independent distributor of personal computers, peripherals and supplies, recently announced the consummation of its plan of reorganization under Chapter 11 of the Federal Bankruptcy Act, as earlier approved by the U.S. District Court.

The company said it made cash payments totaling $5.5 million to creditors in partial settlement of allowed claims of approximately $35 million. It also issued to creditors $14.5 million of noninterest-bearing notes and 150,000 shares of its $100 par-value liquidating preferred stock said to be valued at $15 million.

Additionally, creditors received two million shares of common stock and warrants to purchase 400,000 more shares.

David Cohen, chairman and chief executive officer of Data Access, said that during the 20 months the company operated under Chapter 11 protection it "maintained and strengthened its fundamental business." Pointing out that the company recently achieved its first profitable year since 1978, Cohen added, "Now that the company is out of Chapter 11, it is in an excellent position to become even more profitable, and we feel it is on the threshold of a new period of growth."

The company reported revenues of $34.5 million for the year ended in August and said it has a $30 million tax loss carryforward that will enable it not to pay federal income taxes in the near future.

Verbatim trims domestic staff

SUNNYVALE, Calif. — Flexible storage disk maker Verbatim Corp. recently reported a staff reorganization resulting in the reduction of 175 of its professional and support staff at its U.S. locations — a 6% decrease in its worldwide work force.

The company had previously announced a restructuring of its operating divisions and said the reorganization was part of that restructuring.

The company said that no production employees were affected by the reduction whose purpose was to streamline the organization and improve the firm's ability to meet commitments to customers and overall objectives for sales and profitability.

Current production, product introduction and marketing schedules were not affected by the reorganization, the company said.

Vector Graphic earnings slide

THOUSAND OAKS, Calif. — Financially ailing Vector Graphic, Inc. recently posted a first-quarter loss of $1.8 million, or 24 cents per share, on a sharply declined revenue base.

Vector Graphic, which earlier had announced its intention to seek to be merged or acquired, saw its revenues decline to $2.1 million from year-earlier revenues of $6 million. The loss in the first quarter compared with a year-earlier loss of $701,000, or 12 cents per share.

The firm noted that in response to declining sales, it had previously reduced its work force by 66%, or roughly 100 employees. Expenses for the quarter were reduced to $4.1 million, compared with $7.2 million in the first quarter last year.

CDC to sell credit company, acquires Visicorp subsidiary

MINNEAPOLIS — Control Data Corp. announced recently that it intends to sell its Commercial Credit Co. and related financial businesses. It was also announced that CDC had acquired Communications Solutions, Inc. (CSI) from Visicorp for approximately $5 million in cash.

The Commercial Credit unit was purchased in 1968 and served initially to finance CDC computer sales. CDC said it hopes to complete a sale by mid-1985 and focus more on its computer operations.

Profits at CDC have taken a decided downward turn for the first nine months of the current fiscal year to $600,000, compared with $113 million for the comparable period a year earlier.

The purchase of CSI follows an earlier move to acquire the rights to Visi On from Visicorp along with the absorption of the Visi On development team.

Robert Howell, director of business development for Control Data Software Co., said the acquisition addressed his company's focus on mainframe communications. CSI will operate as an autonomous unit of Control Data Software.

Lee Data to gain Visual Technology through stocks

MINNEAPOLIS — Lee Data Corp. will acquire Visual Technology, Inc. of Tewksbury, Mass., through an exchange of common stock valued at about $16.8 million, the two companies announced last week.

According to a preliminary letter of intent approved by the boards of directors of both companies, Lee Data will exchange one-half a share of its common stock for each share of Visual Technology's 4.9 million shares of common stock outstanding.

As a wholly owned subsidiary of Lee Data, Visual Technology will be operated by its current management, the companies said. Thomas R. Foley, president and chief executive officer of Visual Technology, will become an officer of Lee Data and a member of its board of directors, according to the planned merger.

Visual Technology, a manufacturer of asynchronous terminals, the Commuter portable computer and the Visual 2000 multiuser system, is expected to have its credit facility increased from $19 million to $22 million and, on completion of the merger, to $25 million, with the additional $3 million guaranteed by Lee Data. Additionally, Lee Data will make $3 million of additional financing available to Visual Technology, according to spokesmen.

Lee Data's sales force will market Visual Technology's products, the spokesmen said.

Firm's president indicted for chip trade violations

By Charles Babcock
CW New York Bureau

NEW YORK — The president of International Processing Systems GmbH, a West German firm, was recently indicted by a federal grand jury here for conspiring to smuggle semiconductors to North Korea.

Babeck Seroush was indicted on six counts of violating the Trading with the Enemy Act, with a possible penalty of 10 years' imprisonment and a $50,000 fine on each count, according to Rudolph W. Giuliani, U.S. attorney for the Southern District of New York.

Without informing companies of their destination, Seroush attempted to purchase the following parts, according to the indictment: 10,000 pieces of National Semiconductor Corp. part MM 54C373J; 6,000 pieces of Texas Instruments, Inc. part number SN 54LS154; and 4,200 hybrid integrated circuits designed as components for night vision goggles. All were designed for use at the temperature extremes required for military applications, Giuliani said.

Bound for North Korea

The parts were slated to be shipped to International Processing Systems in Cologne, West Germany, where they would be diverted to North Korea, according to the indictment.

Companies that were approached by Seroush included: Analog Devices, Inc. of Norwood, Mass.; Jaco Electronics, Inc., of Hauppage, N.Y.; Kemet Capacitors of Union Carbide Corp., Tarrytown, N.Y.; and Schweber Electronics of Westbury, N.Y.

Seroush, a 38-year-old Iranian national, until recently had homes in Westport, Conn., and New York as well as Germany. He has been arrested by German authorities for possible extradition to the U.S. to stand trial, Guiliani said.

Tandem doubles revenue with help from tax break

CUPERTINO, Calif. — Tandem Computers, Inc. recently reported that its fourth-quarter profits more than doubled to $21.6 million, or 53 cents per share, from $8.7 million, or 21 cents per share, a year earlier.

The company's profits were boosted by a one-time gain of $9.7 million, or 24 cents per share, resulting from a change in the tax law governing overseas operations.

Revenue for the quarter ended Sept. 30 increased 30% to $153 million, compared with $117.8 million during the same period one year earlier.

For fiscal year 1984, Tandem's revenue rose 27% to $532.6 million from $418.2 million during fiscal 1983. Profits for the year, including the $9.7 million tax benefit, were $42.9 million, or $1.04 cents per share, compared with $30.8 million, or 76 cents per share, the previous year.

James G. Treybig, president and chief executive officer, said sale of the company's high-end Nonstop TXP computer system, which was introduced last year, was the major contributing factor to revenue growth.

Nonrecurring items boost PE quarterly sales income

NORWALK, Conn. — Perkin-Elmer Corp. recently reported that first-quarter profits were $17.5 million, or 39 cents per share, compared with $8.8 million, or 20 cents per share one year earlier.

The profits included nonrecurring items that increased profits by $4 million, equivalent to 9 cents per share, and the company said profits without those items would have been $13.5 million, or 30 cents per share, a 53% increase over the same period on year earlier.

Sales revenue for the quarter ended Oct. 31 was $286 million, a 14% increase over the previous year.

Horace G. McDonald Jr., president and chief executive officer, said the company held the rate of increase in operating expenses below that of sales increases and the company experienced increases in new orders as well as in its backlog of unfilled orders.

Sales for the company's Data Systems Group were $60.2 million, up from $53.6 million a year earlier, and Semiconductor Equipment Group sales were $66.2 million, up from $49.4 million during the same period one year earlier.

Paradyne posts profit increase

LARGO, Fla. — Paradyne Corp. recently reported a 51% increase in third-quarter revenue and a 285% profit increase compared with the third quarter a year earlier.

Revenue for the three months ended Sept. 30 was $76.1 million, compared with $50.3 million a year earlier. Profits for the quarter just ended were $3.1 million, or 14 cents per share, compared with year-earlier profits of $804,000, or 4 cents per share.

Robert S. Wiggins, chief executive officer of Paradyne, expressed pleasure with the company's revenue and order rates during the third quarter but noted that "the international order rate appeared to be dampened by the effect of the strong dollar abroad."

EXECUTIVE CORNER

Jerome Meyer will join Varian Associates, Inc. in the newly created position of president and chief operating officer on Dec. 3.

■

Jonathan Yu has been appointed president and chief operating officer at Applied Micro Circuits Corp. Yu previously had been employed at TRW, Inc. and Burroughs Corp.

■

Frank Zurcher has been named president and chief executive officer of Molecular Computer, Inc.

■

W. Kyle Willis, who recently joined TCS Software, Inc. as chief financial officer, has been appointed president and chief executive officer of the company.

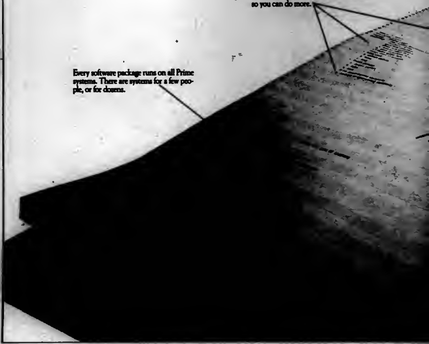
■

F. William Stamper has been appointed president of the MDS Systems Divison at Mohawk Data Sciences Corp. (MDS). Prior to joining MDS, Stamper worked for Control Data Corp.

■

William Porter has been appointed to president, chief operating officer and member of the board of direc-

See EXEC page 84



Cray Research sales up despite increased competition

By Charles Babcock
CW New York Bureau

NEW YORK — Cray Research, Inc.'s sales are increasing at a time when it faces growing supercomputer competition at home and abroad.

Cray Chairman John A. Rollwagen told the New York Society of Security Analysts recently that the Minneapolis-based supercomputer maker expects to install 21 multimillion-dollar systems in 1984. Last year it installed 16; next year it expects to install 30, Rollwagen said.

"If someone orders today, we have to say, 'Sorry, but we can't deliver until the first quarter of 1986, 15 months from now,' " he said.

Expects orders to grow

Still, the pace of orders is expected to grow, Rollwagen said. Forty-five prospects have submitted a written or verbal order for a Cray machine, and 24 of these ordering are new customers. New customers make up almost three-fourths of the prospects that are currently querying Cray, he added.

When asked if Cray, which is used to selling a handful of $6.5 million to $20 million machines a year, could ramp up production, Rollwagen answered by noting that in the past, Cray customers have been reluctant to say they would be willing to buy a new model three years down the road, as Cray forecasters would say demand was likely to decline in three years.

Now, Cray "is taking the courageous step" of predicting that demand will remain steady, rather than decline, and it is increasing production accordingly, he said.

While the bulk of Cray's customers continue to be government and university laboratories, Rollwagen said a growing share are commercial companies, such as the Ford Motor Co., which uses a Cray machine to simulate auto crashes.

Demand strongest for multiprocessor units

Rollwagen indicated that the demand is strongest for its X-MP/2 or X-MP/4 dual and quadruple processor units. "We misjudged to some extent the demand for the top of the line," he said.

He noted that the appetite for supercomputing power is driven by the desire to simulate physical phenomena, such as aircraft flying or atmospheric conditions.

John F. Carlson, Cray's chief financial officer, reported that the company garnered a revenue of $71.6 million and net earnings of $19.6 million, or $1.32 per share, in the third quarter ended Sept. 30. Revenue in the third quarter last year was $31.4 million, with a net income of $2.8 million, or 19 cents per share.

CRAY from page 73

They worry that they will not get the most advanced components until two years after they have appeared in Japanese computers. Cray has developed its own gallium arsenide manufacturing capability to avoid becoming dependent on its competitors, according to Rollwagen; its first attempts have not yielded wafers with working chips.

Japanese may have edge

Browne said taking the step to gallium arsenide components was risky, adding that the Japanese may have an edge in designing gallium arsenide chips.

A start-up company, ETA Systems, Inc. of St. Paul, Minn., an offshoot of Control Data Corp. of Minneapolis, is designing a supercomputer with Cmos chips that are slower than ELC or gallium arsenide but contain a very high density of components per chip. The chip is being designed to execute 10 billion floating-point operations per second and is scheduled to be available in the second half of 1986, ETA spokesmen said.

Rollwagen claimed Cray had a two-year lead on Hitachi and Fujitsu because the Japanese firms were still field-testing their new models and needed more time to develop them. Spokesmen for Fujitsu and Hitachi America Ltd. disputed the claim, saying they were past field-testing and were installing units at locations in Japan.

Amdahl Corp. of Sunnyvale, Calif., which markets Fujitsu supercomputers in the U.S. as the Amdahl 1100 and 1200, said they will be available in the second quarter of 1985. Hitachi has not decided yet whether it will market its S-810 and S-820 supercomputers in the U.S., Hitachi spokesmen said.

SECRETS

from page 73

ganization last June.

In a book to be published next month, Palo Alto, Calif., attorney Robert Spanner likens trade secret litigation to "an excursion into the realms of hell." In a recent interview with *Computerworld*, Spanner, a trade secret specialist with Beckford, Spanner & Kelley, described the "devastating" costs that often result when a computer company gets involved in trade secret lawsuits.

Trade secret cases, Spanner said, "consume the attention and passions of management and are amazingly disruptive [to] the operations of the company." He said the damage can be particularly severe for a start-up company that is hit even by the threat of a lawsuit. Even if the start-up is able to defend against the charges successfully, the financial and emotional costs may doom the planned venture.

"One very important strategic consideration," Spanner noted, "is that as soon as word gets out to the stock market that there is a trade secret litigation instituted or threatened, [investors and customers] will avoid you like the plague."

Spanner said he believes trade secret litigation is on the increase in the computer industry. He said he counsels his clients to avoid such lawsuits "at all costs."

In his book, Spanner writes that one of the stickiest areas of trade secret law is differentiating between proprietary information, which a company's employee — in signing a nondisclosure agreement — promises not to reveal should he leave the company, and the employee's general knowledge and experience, which he is free to use as he wants.

"Courts have had a great deal of difficulty in differentiating an employee's knowledge from company proprietary information," he said. Spanner said that judges are sometimes uncomfortable with these suits because of the "fundamental considerations of personal autonomy involved." A judge must weigh such factors as the use of information that exists in the privacy of an individual's thoughts and an employee's freedom to move from one job to another and to better himself economically, he noted. There are, of course, important economic interests at stake, too; for example, promoting U.S. R&D to help the country's competitive position vis-a-vis foreign companies.

Spanner believes that trade secret law is in a state of general disarray. "Cases presenting similar circumstances are being decided in diametrically opposite ways," he maintained. He would like to see state legislatures consider this complex issue and adopt some kind of uniform statutes.

"It's important to prevent and avoid cynicism on the part of the public with any facet of the law," Spanner said. "I think the word is going to get out that there is no predictability in the trade secret area, and that it depends on who the judge is and whether he likes you. I think that is socially dangerous."

EXEC

from page 82

tors at Startel Corp.

■

Nancy Goodhue was named vice-president of Datatel Minicomputer Co.

■

William Morgan has been promoted to the newly created position of senior vice-president of product operations at Memorex Corp. Prior to working at Memorex, Morgan was employed by Texas Instruments, Inc.

■

Louis Clark has joined Integrated Planning, Inc. as vice-president of product development.

■

Honeywell, Inc. announced the following promotions to group vice-presidents: **Charles Johnson**, large computers and manufacturing systems; and **Eugene Manno**, small computers and office systems.

■

Andrew Knowles has been appointed corporate vice-president at Prime Computer, Inc. Knowles previously worked for Lexidata Corp. and Digital Equipment Corp.

■

George Perlegos, vice-president of engineering, has resigned from Seeq Technology, Inc.

■

Lee Data Corp. announced the appointments of **Douglas Pihl**, senior vice-president of corporate development; and **Don Miller**, vice-president of product development.

■

James Hart has been appointed to the newly created position of senior vice-president and chief operating officer at Avanti Communications Corp.

■

Edward F. Eddy has resigned his position of vice-chairman at NEC America, Inc. to join Ambi Corp. as chairman.

Stephen S. Yau was elected president of the American Federation of Information Processing Societies following the National Computer Conference this past summer. **Per A. Holst** was named vice-president, **Herbert B. Safford** was named secretary, and **Rolland B. Arndt** was named treasurer of the federation. Yau is a professor and chairman of the Department of Electrical Engineering and Computer Science at Northwestern University.

■

Victor D. Poor has resigned as an executive vice-president of Datapoint Corp. and will become a technology consultant to the chairman and chief executive officer of the company.

■

Donald W. Gouldsmith has been appointed to the position of president and chief executive officer at Madic Corp. Former president **Richard Wilke** becomes chairman of the board.

■

IBM PC Workstation–$1595.00

Santa Clara Systems makes your investment in the IBM PC, PC XT or PC AT look even better. Now, everyone in the office can afford to have an IBM PC at their fingertips. Without buying additional computers, and for a fraction of their cost. Only $1595.

The Santa Clara Systems PCterminal, complete with keyboard and monitor, easily connects to any existing PC, PC XT or PC AT allowing you to share the data and resources you already have on hand —hard disk drives, printers, graphic plotters and the like.

Built-in local area networking makes it possible.

PCterminal won't limit your existing PC's performance either. Because it has its own 8088 microprocessor and 64 KB of random access memory, expandable to 256K.

Very intelligent indeed.

But that's not all. Built-in parallel and serial ports, along with four expansion slots enable you to add a host of peripherals, as well as additional memory, graphics cards and other productivity enhancers.

The Santa Clara Systems $1595 PCterminal. A small price to pay for a big gain in productivity.

You won't find a better value anywhere. Your local Santa Clara Systems distributor can prove it. Call and order yours today.

Santa Clara Systems, Inc.

1860 Hartog Dr., San Jose, CA 95131
(408) 287-4640/Telex: 176309 SCS SNJ

Registered Trademarks: IBM, IBM Corporation; Intel, Intel Corporation; PCterminal, Santa Clara Systems.

DATA ENGINEERING SALES, INC.
375 Main St.
Stoneham, MA 02180
617-438-4700

CAJ SYSTEMS, INC.
3 Neshaminy Interplex, Ste 301
Trevose, PA 19047
215-638-0222

AMERICAN MICRO DISTRIBUTORS, INC.
2030 Powers Ferry Rd., Ste 217
Atlanta, GA 30339
404-951-8964

MICROLINES
1134 SW Fifth Ave.
Portland, OR 97204
503-224-3000

ADVANCE DATA PRODUCTS, INC.
18874 Bonanza Way
Gaithersburg, MD 20879
301-424-0400

KALTRONICS DISTRIBUTING INC.
702 Landwehr Road
Northbrook, IL 60062
312-291-1220

KALTRONICS DISTRIBUTING INC.
10850 Switzer Rd., Ste 105
Dallas, TX 75238
214-348-1022

COMTEC
534 Salem Ave. SW
Roanoke, VA 24016
703-981-0326

KALTRONICS DISTRIBUTING INC.
833 West Main St.
Carmel, IN 46032
317-848-4001

FERRARI COMPUTER SERVICES, INC.
1980 Howard Ave. Ste 206
Vienna, VA 22180
703-821-3080

COSTA DISTRIBUTING, WEST
561 San Mateo Ave.
San Bruno, CA 94066
415-952-6113

COMPUSERVE
1675 West Eighth Ave., Ste 219
Vancouver, B.C., Canada BC V6J 1P2
604-733-7783

COMPUSERVE
606 Hood Rd.
Markham, ON, Canada L3R 3K9
416-477-0008

COMPUSERVE
3450 Drummond St., Ste 2
Montreal, PQ., Canada H3G 1Y2
514-844-8343

MERGERS AND ACQUISITIONS

Avant-Garde Corp. announced recently it has reached an agreement in principle to acquire 100% of the common stock of **Human Engineered Software Corp.** (HES). HES will become a wholly owned subsidiary of Avant-Garde.

Final settlement will depend on Avant-Garde reaching a conclusive agreement with HES' principal secured lender. HES last month filed for relief under Chapter 11 of the Federal Bankruptcy Act. The bankruptcy court must also approve an HES plan of reorganization.

■

Anacomp, Inc. announced that the board of directors of its majority-owned subsidiary **USA Communications, Inc.** has approved an agreement in principle for the sale of substantially all of the assets of USA Communications to **Outlet Communications, Inc.**, a wholly owned subsidiary of the Rockefeller Group, a private company owned largely by the Rockefeller family.

The $22 million cash sale is subject to the execution of a definitive agreement and necessary USA Communications stockholder and regulatory approvals. On a fully diluted basis, assuming exercise of all outstanding warrants and options and the retirement of USA Communications' retained liabilities, the purchase price is equivalent to approximately $3.10 per share of USA Communications common stock. Anacomp owns 2.4 million shares of USA Communications common stock.

■

Bell & Howell Co. announced that it has agreed to purchase certain assets of **3M Co.**'s computer-output microfilm (COM) business. A COM system electronically transfers data from a computer directly onto microfilm instead of paper and is the most economical computer data storage method available.

■

Honeywell, Inc. and **Digital Datacom, Inc.** have announced that they have signed an agreement providing for a merger whereby Honeywell will acquire Digital Datacom, a Laguna Niguel, Calif., maker of work center manufacturing systems, for $10 million in cash. The two companies had signed a memorandum of understanding in August.

■

Data I/O Corp., Redmond, Wash., and **Futurenet Corp.**, Canoga Park, Calif., jointly announced that they have entered into a definitive agreement associated with the Data I/O's acquisition of all of Futurenet's outstanding shares in exchange for 2.16 million shares of Data I/O common stock, which had been announced in late August.

The acquisition will be accomplished through the merger of a Data I/O subsidiary and Futurenet and will be considered a pooling of interests. The transaction is conditioned upon certain regulatory filings and approval of Futurenet's shareholders.

■

MSI Data Corp. entered into an agreement in principle to acquire **Azurdata, Inc.** of Redmond, Wash., for an undisclosed amount.

Completion of the transaction is subject to execution of a definitive agreement that must be approved by the boards of directors of both companies and by the Azurdata stockholders.

■

NCA Corp. announced it has agreed to acquire **The Systems Practice, Inc.** for an undisclosed amount of NCA common stock. Terms of the acquisition were not available.

SUPERSHORTS

Miniscribe Corp. has signed an agreement with **Arrow Electronics, Inc.** to distribute Miniscribe's entire line of Winchester disk drives. Lawrence J. Klassen, vice-president of marketing at Miniscribe, said the contract is a multiyear agreement with a potential value in excess of $20 million.

■

AT&T Information Systems and **The Computer Store, Inc.** announced an agreement whereby The Computer Store will market the AT&T personal computer and accessories in their 12 stores located in New England and the mid-Atlantic states. Terms of the agreement were not available.

■

Relational Technology, Inc. and **Burroughs Corp.** signed an OEM pact granting Burroughs the right to distribute Relational's Ingres relational data base management system with its new supermicrocomputer. Terms of the agreement were not available.

■

Savenet, Inc., **CP National Corp.**, **American Network, Inc.** and **Pacific Telecom, Inc.** announced they have reached agreements in principle for the merger of the discount long-distance telephone services of Savenet and CP National's passport operations into American Network, a publicly held company. The agreements are subject to the approval of the boards of directors of all companies. The transaction is expected to be completed by late November.

■

Stratus Computer, Inc. announced the formation of two key corporate departments intended to enhance further the company's ability to deliver advanced products.

Hardware and software development have been consolidated into a single engineering department. A newly created group focused on emerging technologies and business opportunities also has been formed.

■

Charles River Data Systems announced an agreement worth an estimated $5 million to deliver 275 of its Universe 68 computer systems and Unos operating system software to the People's Republic of China over the next 18 months. At the same time, the company received a specific contract to ship the first $1 million worth of hardware and software.

■

Ferox Microsystems, Inc. announced the formation of a new division called **Ferox Information Systems** (FIS). Lead by Dr. Timothy Hallinan, FIS will develop a series of products to present a range of business, social, economic and financial statistics in a concise format on single diskettes.

■

Vitalink Communications Corp. and **Digital Equipment Corp.** announced an agreement under which the two companies will cooperatively market a hardware and software product called Translan that transparently connects local-area networks via satellites and/or terrestrial lines.

The agreement calls for Vitalink to receive a technology license from DEC as well as cooperatively market Translan with DEC. Translan will be sold, serviced and supported by Vitalink.

■

Ashton-Tate announced it has signed a $10 million contract with French software distributor **La Commande Electronique** to distribute Ashton-Tate's current business software products in France. Terms of the agreement were not disclosed.

■

Visual Technology, Inc. announced that it will be moving its New York printed-circuit board assembly operations to its principal manufacturing facility in Massachusetts. Work force reductions will result in the termination or layoff of approximately 190 employees, primarily in New York.

See SUPER page 89

STC

from page 73

shareholders, creditors, employees and customers."

The meeting was called by the trustee to form a creditors committee to review and make recommendations on the company's financial plans as part of the court-monitored reorganization. At the time of that meeting, the company announced the filing of a petition to place another subsidiary, Media Technology Corp., under Chapter 11 protection for reorganization.

Aweida told the creditors the company expects to emerge from reorganization as a "stronger, possibly smaller, but more competitive operation." He said the company is optimistic about its core business of providing storage tape and disk products and is excited about its optical disk products.

COMPUTERWORLD
~~$44.00~~
$39.00

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

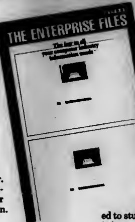
postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Box 897
Framingham, MA 01701-9985

Send for this FREE brochure and find out why the Enterprise Files may be your most important marketing tool



The Enterprise Files from International Data Corporation give you the detailed sales information you need to stay ahead in today's competitive computer market.

Now you can locate prospective clients, fine-tune your promotional campaigns, and track competing companies. And you'll do it all quickly, easily, and accurately.

When you subscribe to the Enterprise Files you'll get up-to-date facts on more than 13,000 companies and the 35,000 computer-related products & services they offer. Many leading organizations have already made the Enterprise Files their number one source of information. Here are four reasons why...

1) Comprehensive listings

The Enterprise Files are divided into two general categories, Vendor Files and Product Files.

Each vendor profile includes: company and division names, parent company, address and telephone number, type of company, number of employees, years in business, target industries, target applications, key corporate executives, geographic coverage, and product/service offerings.

Every product profile includes: price, model number, date of introduction, the number of installations, channels of distribution, and market status. Also, each product or service is researched individually, with up to 25 product-specific characteristics identified.

You'll get everything you need to compare product specs and contact vendors.

2) Custom packaging

No matter which companies and products interest your organization, you can get the information you need, the way you need it. Because the Enterprise Files are available in three ways. You can choose the complete file, any of 26 standard subfiles, or custom packaging. So you'll pay only for what you need.

3) Easy to use

Once you've determined what kind of information you need, you can choose between three convenient ways of receiving your information. Magnetic tape for permanent storage, pressure sensitive labels for direct mail promotions, and hard copy for a handy resource tool.

4) Accurate listings

The information in the Enterprise Files is gathered and updated daily by International Data Corporation. IDC has been the leading market research firm covering the information processing industry for 20 years. And IDC is the only firm solely dedicated to studying this market. So you can rely on the information in the listings.

Send for your FREE brochure today

Can you afford to be without this kind of detailed information about your industry? Put the Enterprise Files to work for you. Call Mike Hovagimian today to get your FREE copy of our brochure. It describes what the Enterprise Files are, what your custom packaging options are, and includes a rate sheet. Call right now. You can reach Mike at (617) 872-8200.

Or, if you prefer, fill out the coupon below and return it today.

☐ Yes, I want to get all the latest market information. Rush me a FREE copy of your brochure today so I can see how the Enterprise Files can help me.

Name ______
Title ______
Company ______
Address ______
City ______
State ______ Zip ______ Phone ______

Return to:
Mike Hovagimian, International Data Corp.,
5 Speen Street, Framingham, MA 01701

IDC
INTERNATIONAL DATA CORPORATION

NICKELS AND DIMES

Computer Sciences Corp. reported profits for the second quarter ended Sept. 28 were $3.4 million, or 25 cents per share, compared with $4.4 million, or 32 cents per share, for the year-earlier period. Revenues were $172 million, compared with $184.4 million in the corresponding period last year.

The lower profits resulted primarily from an expected decrease in international revenue and higher interest expenses, due to bank borrowings, according to William Hoover, chairman and president of Computer Sciences.

■

Masstor Systems Corp. announced that revenues in the third quarter ended Sept. 30 increased to $6.1 million, compared with $4.8 million in the comparable period one year ago. Net loss for the quarter was $3.8 million, or 24 cents per share, compared with a net loss of $3.2 million, or 22 cents per share, in the same quarter last year.

■

Stratus Computer, Inc. reported revenues for the third quarter ended Sept. 30 were $11.1 million, an 87% increase from $5.9 million in last year's quarter. Profits were $1.5 million, or 8 cents per share, compared with $695,000, or 4 cents per share, in the corresponding period one year ago.

■

Zentec Corp. announced revenues for the third quarter ended Sept. 29 of $6 million, compared with $5.4 million for the same period one year earlier. Profits were $101,000, or 3 cents per share, compared with a net loss of $950,000, or 28 cents per share, in the same quarter last year.

■

Keane, Inc. reported profits for the third quarter ended Sept. 30 of $169,000, or 19 cents per share, up from $8,000, or 1 cent per share, a year ago. Revenues were $8.9 million, up 72% from $5.1 million for the same quarter one year earlier.

■

Cray Research, Inc. announced revenues for the third quarter ended Sept. 30 were $71.6 million, compared with $31.3 million in the same period a year ago. Profits were $19.5 million, or $1.32 per share, compared with $2.8 million, or 19 cents per share, for last year's quarter.

XEROX

from page 73

IBM has chosen to set the hardware standard in manufacturing systems, with a technical hardware umbrella covering everything from the 4361 to a serial OEM interface to a workstation adapter for factory robots.

Personal computer spreadsheets and vertical agricultural programs are easier niches for IBM to target than complex factory automation programs like material requirements planning, he said, which require support from processing, routing, production, inventory control and purchasing systems.

IBM presently offers only a skeleton of a modern manufacturing system, Fello said. XCS' manufacturing software has two advantages over IBM's, he claimed: It takes up half the space on the mainframe and is easily upgraded, which allows small companies to upgrade with hardware that ranges from networked terminals to IBM's 3084 turnkey system.

IBM's factory automation strategy will use its Personal Computer as a basic building block, Fello predicted. "IBM will corner the market with [its] 370 architecture on single- and multiple-station desktops," he said.

XCS' relationship with Xerox offers the best of all possible worlds, Fello said. The disadvantage to the relationship, however, is XCS' close connection to Xerox Corp.'s copier image, he added.

SUPER

from page 88

Bolt, Beranek and Newman, Inc. (BBN) reported its BBN Communications Corp. subsidiary has received a contract for a private wide-area data communications network from Olivetti, S.P.A. for their customer Snam. Snam is a unit of the ENI Group, Italy's $25 billion energy corporation.

The contract is for packet-switching hardware and software. The network will link terminals in 180 cities throughout Italy with 26 ENI computer centers.

■

VLSI Technology, Inc. (VTI) and **Lattice Semiconductor Corp.** jointly announced the signing of a technology and product cross-licensing agreement.

Under the agreement, VTI will receive alternate sourcing rights for very high-performance, electronically erasable programmable read-only memories, static random-access memories and programmable logic devices in development by Lattice.

In exchange, VTI will provide Lattice with wafer fabrication, assembly and test capacity, product engineering and equipment leasing support. Both companies will support joint product development and future product cross-licensing.

■

Matsushita Electric Corp. of America has named Stephen S. Ingersoll, former U.S. ambassador to Japan, as the chairman of a new $10 million foundation to promote education in the U.S.

The foundation will rank in the top 25% of U.S. corporate foundations, according to the "Foundation Directory," and is the largest foundation established by a Japanese company in the U.S.

■

Philon, Inc. has acquired rights to a data base management system developed by the California-based MAG Software, Inc. This agreement also includes the development of proprietary enhancements for future Philon product offerings.

■

National Intergroup, Inc. announced that it has formed a wholly owned information services subsidiary named Genix. Genix will offer software sales, computer consulting services and remote computer services from National Intergroup's modern computer data center in Pittsburgh.

The subsidiary will be operated by Raul Pupo, president; Joseph Murphy, vice-president of operations and technology; and John Kelly, vice-president of finance.

■

Verbex, a division of Exxon Corp., and **Lear Siegler, Inc.'s** instrument division announced that they have signed a license agreement that transfers Verbex's continuous speech recognition technology to Lear Siegler.

Under the terms of the agreement, Lear Siegler has access to Verbex's Model 3000 proprietary continuous speech recognition technology. Lear Siegler's license permits it to use the Verbex technology to supplement its extensive development in voice recognition products for military and commercial aircraft instrument/avionics systems as well as military land and amphibious vehicle controls.

■

The **Paxnet** local-area network software system, introduced last year by Phoenix Software Associates, Ltd., has been sold to Vianetix, Inc. of Boulder, Colo. Vianetix will market the software under the name Vianet.

■

Scientific Micro Systems, Inc. (SMS) has announced a second-source agreement with Data Technology Corp. (DTC). The agreement licenses DTC to manufacture and sell the SMS Omti Series 5000 and Series 6000 SCSI controller boards and to purchase and resell the SMS Omti Series 5000 controller chip sets.

■

NEC Telephones, Inc. and **Compath National** announced the signing of a two-year agreement in which Compath has been awarded nationwide distribution rights to market the Neax 2400 information management systems product line.

■

Micronix Corp. announced it has signed a patent cross-licensing agreement with AT&T.

The agreement states that Micronix and AT&T may each use present and certain future patents relating to lithographic manufacturing equipment. It includes patents developed by AT&T and Micronix for implementing x-ray lithography.

If the space program had advanced as fast as the computer industry, this might be the view from your office.

POSITION ANNOUNCEMENTS

SOFTWARE PRODUCTS

ARE YOU A GOOD ASSEMBLER PROGRAMMER?

DO YOU WANT TO LEARN MORE "STATE-OF-THE-ART" PROGRAMMING TECHNIQUES AND LEARN HOW SYSTEMS REALLY WORK?

In 1973, **Compuware** was just an idea, a dozen employees and $300,000 in revenues. Today, we have grown to over 600 permanent salaried employees and have revenues in excess of $45 million. **Compuware** is dedicated to researching, developing and marketing innovative data processing products and services. We offer custom programming design, analysis and support and on-site training for established users of mainframe, personal and minicomputers.

Compuware develops software products for the IBM mainframe market. Our internationally known award winning products, **Abend-AID** and **File-AID** have over 2500 users worldwide.

Our environment will provide you with a unique opportunity to **DEVELOP, MAINTAIN, SUPPORT AND DISTRIBUTE** your code to our users. We are not the normal data processing shop! Our products run on the most current releases of IBM's operating systems. Our products must also run on VS1 and older DOS releases. Can you step up to the challenge of writing code that will run on this variety of environments? Do you have the foresight to program for the unforeseen changes to operating systems and environments?

Some of our programmers are Systems Programmers that decided that they wanted to create the software that they always wanted. Others are good Assembler Programmers that wanted to learn more about systems. These programmers found a home. Our Technical Development and Support Group personnel enjoy what they are doing.

Due to expansion within our division, we have immediate opportunities available in the following areas:

PRODUCT DEVELOPERS

The Product Developers are the backbone of the Technical Development and Support Department. Their expertise is relied on for new product development and product maintenance. We are currently looking for Product Developers to work on our **CICS, IMS-DC, and File-AID** products. The qualifications for these positions are:

- **CICS** · This individual will assist the CICS team to develop new enhancements to our current products and maintain these systems. A thorough understanding of CICS is necessary.
- **IMS-DC/VTAM** · This person will provide our group with the expertise in VTAM or IMS-DC to bring a new product to market.
- **File-AID** · This individual will contribute to the File-AID team by assisting them to develop and maintain the File-AID product line. A good understanding of OS and MVS systems, data management and file systems is necessary along with a thorough comprehension of ISPF/PDF.

PRODUCT SPECIALISTS

The Product Specialist is the sales/technical interface of the Products Division. Their primary respdnsibility is to provide the sales staff with the tools that are necessary to sell our products and to provide our customers with the training and support they need to use our products. Indepth knowledge of programming environments and our products is essential. Specific areas of concentration are:

- **DOS** · Our involvement in the DOS marketplace is always increasing. Due to this expansion, we require an individual that understands the DOS environment to assist our sales staff and development team market our products and further improve our presence in the marketplace.
- **File-AID** · This product has expanded so rapidly that we need to add another Product Specialist to our staff. This individual will possess excellent presentation skills and a thorough knowledge of ISPF/PDF.

PRODUCT SUPPORT REPRESENTATIVES

The Product Support Representative's purpose is to supply the highest level of professional and technical assistance to **Compuware**'s customers and sales staff. Specific areas of expertise that we are looking for include:

- **CICS** · This individual will assist our team to support our customers and sales staff in the use of our CICS product line.
- **GENERAL SYSTEMS** · This individual will provide support to our customers in a variety of areas. We are looking for an individual with a good systems background.

SERVICES DIVISION

We have immediate requirements for individuals to work at various branch locations across the country. These are permanent salaried positions on long term projects. The requirements are as follows:

- **IDMS with ADS/O**
  - Programmer/Analysts for installations and conversions
  - Data Base Analysts for logical data base design
- **PROGRAMMER/ANALYSTS** · Two or more years' experience with **CICS, DL-1** utilizing **COBOL** or **PL-1.**
- **PROGRAMMER/ANALYSTS** · Experienced on **VAX VMS** or **PDP RSX-11M** utilizing **FORTRAN** to work in Chesapeake Bay area. Process Control or Yourden experience a plus.

If you're seeking greater challenges than your current position allows, you'll enjoy **Compuware**'s diverse, excitingly innovative and highly advanced projects. Your efforts will be recognized and rewarded with a salary commensurate with experience, comprehensive benefit package, incentive bonuses and a unique career advancement program for dp technicians. And, you'll enhance your skills with our proven in-house training program. You may send your resume in confidence or call weekdays from 9 a.m. to 5 p.m.:

1-800-292-7432

COMPUWARE

32100 Telegraph Road • Birmingham, MI 48010

ALEXANDRIA • BALTIMORE • BOSTON • DALLAS • DETROIT • HARTFORD • HOUSTON • NEW YORK
PORTSMOUTH • SAN DIEGO • WASHINGTON D.C.

AUSTRALIA • ENGLAND • FRANCE • GERMANY • ISRAEL • ITALY • JAPAN • NORWAY • SPAIN

Equal Opportunity Employer

PROGRAMMERS/ ANALYSTS

You're Judged By The Company You Keep!

AUXTON COMPUTER ENTERPRISES, INC., is a management consulting organization specializing in the development of business applications software for the communications industry. We are presently expanding our technical staff in several of our branch offices to meet the increasing demand for our software products, and are seeking qualified computer professionals in the areas listed below.

Programmers/Analysts: Individuals must possess 3+ years experience in the design and programming of business applications using PL/1. Experience in BAL, IMS DB/DC, Data Dictionary, TSO/SPF, OS/MVS helpful.

Programmers/Analysts: Candidates must have a minimum of 3+ years experience programming in COBOL with CICS (COMMAND or MACRO levels). Exposure to ADABAS, NATURAL, FOCUS, RAMIS, or MARK IV helpful.

Programmer/Analysts-Systems Programmers: Ideal candidates will have 3+ years experience using "C" language and *UNIX operating systems.

These positions offer an ideal opportunity to progress with one of the fastest growing consulting service organizations in the telecommunications industry. Competitive salaries and excellent benefits are included, of course.

Opportunities exist in the following cities:

CHIC., IL. ORL., FL.
PHIL., PA. WASH., D.C.
NORTH & CENTRAL N.J.

Send resume indicating the city of preference to:

AUXCO

Auxton Computer
Enterprises, Inc.
851 Trafalgar Ct. Ste 300 W Wing
Orlando, Florida 32751

AUXCO is an equal opportunity employer
*UNIX is a trademark of Bell Laboratories

IBM SERIES/1 EDX/EDL

Contract programming opportunities. AIC Analyst Corporation is expanding their IBM Series/1 consulting staff. If you have 2+ years of experience using EDX/EDL and you are interested in state-of-the-art challenges, we are anxious to discuss a career opportunity with you.

In reward for your experience and technical expertise, AIC offers a highly competitive salary and benefits package. Please call or send your resume in confidence to:

**Analyst International
Corporation
1201 North Watson
Suite 130
Arlington, TX 76011
(817) 640-9961**

Independent contractor positions also available.

Tech Specialists

Analysts * Programmers

Our nationwide network of Data Processing career advancement specialists has been designed to match your ambition with the best location and opportunity in the country.

Your resume sent to just one of our affiliates can be made available to any or all major markets across the U.S.

We are just a few of the members of EDP Resource Group. Describe your career goals to one of us. We're waiting to hear from you.

Don Richard Associates, Inc.
DC 1717 K Street, N.W.
Suite 1000
Washington, DC 20006
(202) 463-7210

Frank Leonard Personnel, Inc.
FL 1211 N. Westshore Blvd
Tampa, FL 33607
(813) 872-1663

Clayton Group, Inc.
IL One South 450 Summit Ave.
Oakbrook Terrace, IL 60632
(312) 953-2290

Check Mate Careers
KS of Wichita, Inc.
P.O. Box 8030
Wichita, KS 67208
(316) 685-4144

Computer People, Inc.
MN Park National Bank Building
5353 Wayzata Blvd., Suite 604
Minneapolis, MN 55416
(612) 542-8820

Accredited Personnel Services
NC North Hills Office Center
3804 Browning Place, Suite 7
Raleigh, NC 27609
(919) 782-3024

EDP, Incorporated
NC Suite 305, One Fairview Plaza
Charlotte, NC 28210
(704) 554-1101

Energy Search Consultants
2140 South Harvard, Suite 105
Tulsa, OK 74114
(918) 743-4404 OK

Personnel Consultants, Inc.
625 Stanwix St., Suite 2306
Pittsburgh, PA 15222
(412) 471-0103 PA

RH Unlimited, Inc.
9440 Two Notch Road, Suite 8
Columbia, SC 29223
(803) 788-3884 SC

Data Processing Resources, Inc.
3000 Wilcrest, Suite 185
Houston, TX 77042
(713) 953-0257 TX

Don Richard Associates
510 East Main Street
Richmond, VA 23219
(804) 644-0661 VA

International Search,
Wisconsin
P.O. Box 271
Green Bay, WI 54305
(414) 336-2383 WI

EDP resource GROUP

AFFILIATES NATIONWIDE

Computer

Software Analysts

SPACECOM, the Space Communications Company, owner and operator of the most advanced satellite system in existence today, needs software analysts to perform development and maintenance on its real-time satellite control computer system. Located at the White Sands Ground Terminal near Las Cruces, New Mexico, SPACECOM offers challenging opportunities in new and exciting programs of national significance.

SENIOR ANALYSTS

- 5 years minimum experience
- FORTRAN and/or Assembler language
- Hardware experience in UNIVAC 1100, DEC PDP 11, or related systems
- Real-time/communications applications

ANALYSTS

- 2 years minimum experience
- Plus the above background

Highly desirable for both levels is networking, hardware/software interface, JOVIAL or other algorithmetic language and/or data base applications.

SPACECOM provides an attractive compensation package that includes relocation reimbursement as well as competitive salaries. Interested individuals should forward their resumes to Gretchen Ricketts, Personnel Administrator, SPACECOM, P.O. Box 235, Las Cruces, New Mexico 88004. U.S. Citizenship is Required. We are an Equal Opportunity Employer.

The courage to lead

SPACECOM.
SPACE COMMUNICATIONS COMPANY
[illegible]

The best technology in the business. Absolutely nothing is more important to an ambitious High Tech professional than having the most complete, state-of-the-art systems support possible.. because when your environment looks to the future, your imagination is free to take you there.

Our MVS/XA shop will offer you the latest software, including Omegamon CICS, Omegamon MVS, IMS/DB, SMP, ACF/VTAM and CICS 1.6.1, along with a brand new 31,000 sq. ft. computer facility with everything you need to fire up your creative edge.

Technical Services:

NCC Manager

5 years Network Control experience in a large mainframe environment. Should be familiar with SDLC/BSC protocols, CICS, NCCF, VTAM/NCP, NPDA, NTO, INFO/MGT, 3270 family of terminals amd DECNET. Should have end user rapport and proven organizational skills. Will manage a minimum of 10 people. The anticipated network expansion will provide a seasoned manager with the opportunity to build a Network Control Center of the future.

CICS Systems Programmer

Successful candidate will be well versed in all aspects of CICS, SMP and MVS operating systems. Experience with BTAM and/or VTAM, plus good oral and written skills desired.

MVS Systems Programmer

Experience with MVS/SP or MVS/XA operating systems in a large environment required, as well as JES 2, TSO, MVS/EXITS and SMP. Software package installation/maintenance with IBM and OEM products experience also desired. Knowledge of 308X processors, 3350, 3380 DASD is beneficial. Finally, a proven ability to perform problem diagnosis and read dumps is necessary, as is user support experience.

Applications:

Senior Systems Analysts

For an Automated Claims System, we seek individuals with IMS/DB expertise. Successful candidates will design and coordinate technical activities for major CICS IMS/DB projects.

Senior Programmer Analyst

Individual to aid in developing an on-line CICS Automated Brokerage system which utilizes CICS command level COBOL and VSAM file structures. We seek CICS command level expertise. 10% travel required (Atlanta & San Francisco).

Programmer Analysts

We seek several IBM OS COBOL professionals to work on large insurance and financial systems in both batch and on-line environments. CICS command level experience necessary for on-line projects.

If you're the kind of High Tech professional who looks beyond the mind's eye to tomorrow's innovations, come to — Crum & Forster.

For a preliminary screening, call us at (201) 285-7110

Or forward your resume for immediate consideration to: **Personnel Manager, Dept. CW 12, Crum & Forster Corporation, 305 Madison Avenue, Morristown, New Jersey 07960.** An equal opportunity employer m/f/h/v.

Crum & Forster
Corporation
a Xerox subsidiary

SOFTWARE PROFESSIONALS

ROCHESTER GAS & ELECTRIC is a major investor-owned utility serving western New York State. We are located in the heart of New York State's wine country and vast apple orchards. Here, we enjoy endless recreational activities on the shores of Lake Ontario and in the nearby Finger Lakes region.

Our data processing environment consists of multiple IBM and Data General processors and is expanding rapidly. With the recent installation of our IBM 3083 running MVS/XA, JES2, CICS, ADABAS, TSO/E, ISPF, ACF2, UCC1, and UCC7/11, and with all new peripherals including IBM 3725s, 3380s, and very shortly, IBM 3480 tape drives, RG&E is committed to the future.

To help us shape this bright future, we are currently looking for:

• LEAD COMMUNICATIONS SYSTEMS PROGRAMMER

To lead a staff of four in support of all telecommunications hardware and software systems. A strong background in ACF/VTAM, ACF/NCP, and CICS is required as is experience in the design and implementation of multi-vendor, multi-host networks. Experience in integrating ASCII terminals into the network is preferred along with a working knowledge of NCCF and NPDA.

• MVS SYSTEMS PROGRAMMER

To become involved in building and maintaining a state-of-the-art MVS/XA environment. Initially to design and implement a comprehensive DASD management methodology, install program products, and develop user exits. This position could grow into a senior systems programming position with responsibilities for major operating system components. Candidates should have experience with DASD management, VSAM, assembler language programming, and installing program products using SMP.

At RG&E we believe in our commitment to excellence and are dedicated to providing the on-going technical training necessary to ensure this excellence.

We offer excellent starting salary, benefits, and relocation package. Please send your resume to:

RG&E

Barbara G. Mettler, Employment Interviewer/Professional
Rochester Gas & Electric Corporation
89 East Avenue
Rochester, New York 14649

or call (716) 546-2700, extension 4625

AN EQUAL OPPORTUNITY EMPLOYER

CHRISTIAN BROTHERS COLLEGE

DIRECTOR OF THE TELECOMMUNICATIONS INSTITUTE

February 1985 is the official date for the commencement of Christian Brothers College's new Telecommunications Institute. The Institute is a planned educational division of the college, formed in partnership with local and national businesses in the tele- and datacommunications related fields. Endowed funding for the institute has been provided by these businesses and industries. The Director, responsible to the Vice-President for Academic Affairs, serves as the executive officer for the Institute, and is responsible for the following areas: advancement and promotion of the Institute's services to local and national businesses (including continuing education programs); planning in coordinating the college's undergraduate and future graduate programs in these fields, chairmanship of the Institute's Advisory Board; and, consultant to and college liaison with local businesses.

Christian Brothers College, founded in 1871, is the oldest private, Catholic college in the Mid-South, whose educational programs encompass engineering, business, the arts, and sciences.

Candidates for the position should possess: a minimum of ten years experience (or related industry experience) in systems planning in an area of satellite, telephone, radio, fiber optics, or computer communications; excellent management and human relations skills. Preferred qualifications: advanced degree(s) in business or engineering and experience in higher education. Salary and benefits competitive.

Application deadline is December 15, 1984. Send resume to:

Brother Anthony Pisano, FSC, Ph.D
Vice-President for Academic Affairs
Christian Brothers College
650 East Parkway South
Memphis, Tennessee 38104

SENIOR ANALYSTS/ PROJ. LDRS.

Outstanding mfr's. in Western NY & Northern PA need stable, hard charging sr. analysts to manage major mfg. projs. Req. min. 4 yrs. exp. + knowl. of DOS/VSE systems. Pref. strong bkgrd. w/CICS, DL-1 & mfg. sys. Positions in semi-rural areas offer excitement, laid back life style, low cost of living. Excellent for family oriented person. To $38,000.

ROBERT HALF OF BUFFALO, INC.
420 Main Street
1310 Liberty Building
Buffalo, NY 14202
(716) 842-0801
Personnel Agency

Systems Programmer

Excellent opportunity with a rapidly growing direct mail firm for someone with three to five years systems programming experience. DOS environment. CICS and Database Management. Knowledge of mail software a plus. We are looking for someone with managerial skills to advance into a Director/Administrator position. Please send resumes to

North American Communications, P.O. Box 38,
Duncansville, PA 16635

DATA PROCESSING PROFESSIONALS

"COME TO WHERE YOUR FUTURE IS"

Why settle for less than the best positions for programmers, analysts, systems programmers? We specialize in both regional and national markets, working with prestigious Fortune 500 companies. Call, send a resume or business card for a confidential - no obligation listing of our top "50" career opportunities.

All employment costs, including relocation, assumed by client companies.

For immediate consideration, call or send resume including present salary in confidence to:

[illegible]

fox-morris
personnel consultants

ATLANTA BANKING POSITIONS
$25,000 to $40,000

Need several Programmer/Analysts, Senior Analysts, and Team Leaders for IBM Shops. Relocation Expenses Paid.

Send resume to:

Jim Heard
EDP Consultants, Inc.
3067 Bunker Hill Road,
Suite 204
Marietta, Georgia 30062
404-971-7281

SR. PROGRAMMER/ ANALYST

TANDEM® Data Communications Expert
Needed For Pacesetting
BURROUGHS SYSTEM ENHANCEMENTS

Through a solid commitment to ongoing expansion and innovation, BANK OF VIRGINIA moved from 4th to 3rd largest bank in Virginia — and we continue to remove barriers to product excellence and flexibility. The user-oriented professionals who design and implement the computer modifications essential for growth are the primary forces behind our success.

We invite you to join this elite team and participate in data communications and authorizations functions, to include: TANDEM SOFTWARE/HARDWARE PLANNING, LINE LOAD EVALUATION & RESOLUTION, and TEST & IMPLEMENTATION OF TANDEM SYSTEM RELEASES. You will participate in and direct the development, implementation, and/or revision of the authorization functions.

To qualify, candidates should have Tandem Net, Tandem systems software experience, and the ability to implement patches or any changes involving communications protocols.

Investigate this opportunity with Bank of Virginia; our better offer will be sweetened with an environment that lends itself to advancement. In Richmond, you will be located near prime Atlantic Coast vacation spots, major historic attractions, and universities. For additional information and immediate consideration, please forward your resume in confidence to: Management Recruitment Officer, BANK OF VIRGINIA, Operations Center, P.O. Box 25339, Richmond, VA 23260 or telephone (804) 747-2687. An equal opportunity employer M/F/H.

Expanding the horizons of banking **Bank of Virginia**

SR. PROGRAMMING SPECIALIST

An opening exists for a seasoned professional who is a self-starter and who enjoys *programming* state-of-the-art systems.

Reporting to the Director of MIS, Power Conversion Group, responsibilities will entail the programming of systems that will address the needs of management at both the plant and Group level.

Specific applications at the plant level entail the bar-coding of ASK manufacturing software modules, and the development of both CAM and micro-computer applications geared to improve user productivity. Experience on the HP-3000 with a command of Fortran, and a working knowledge of Cobol is required.

Specific applications at the Group level entail programming micro-computer applications relative to the Marketing, Sales and Financial areas, and the transferring of data from/to the HP-3000. A working knowledge of micro-computer software (dBase II Wordstar, etc) is preferred but not required.

The ideal candidate will have a B.S. in Computer Science plus 10 years experience.

The Power Conversion Group is a dynamic organization which offers rich rewards to top performers. For immediate consideration send resume to David Swant.

COMPUTER PRODUCTS
POWER CONVERSION
201 Gateway Dr.
Pompano Beach, FL 33060
An Equal Opportunity Employer M/F/H/V

GIVE YOUR CAREER A SHOVE BY LOOKING IN THE CLASSIFIED PAGES OF COMPUTERWORLD

Call 1-800-343-6474
or (617) 879-0700
for more information

IBM

TECH SUPPORT

OUTSTANDING OPPORTUNITIES for Systems Programmers and Data Base Analysts.

* CICS systems programmers experienced in installation, maintenance, performance tuning and tuning can choose any of several ideal locations including Orlando, Jacksonville, Raleigh, Atlanta, Dallas. $30 - $45K.

* Strong MVS internals candidates, or those experienced with MVS-XA can choose Jacksonville, Miami, Orlando, Atlanta, Houston and several other [illegible] locations. $30 - $45K.

* DOS/VSE Requirements have returned, especially for those with VM/CMS. Opportunities in West Palm Beach, Orlando, rural Georgia, El Paso. $27 - $40K.

* Data Base expertise – IMS DB/DC – can qualify you for excellent opportunities in Jacksonville, Orlando, St. Petersburg, Melbourne, Atlanta, Raleigh or several locations in TX. 5 OPEN.

PROGRAMMER ANALYSTS

DEMAND IS GROWING in all industries.

* Banking, HOGAN experience, DDA, item processing, ATM can all get you to the Sunbelt. Large Scale IBM and COBOL preferred. $20 - $35K.

* Insurance. The password is Health Care. The new HMO's need support. Any experience or much experience acceptable. Salaries from $20 to $35. Supervisory positions available. Relocate south, north, east or west.

* Manufacturing, IDMS, ADSO, FOCUS, strong background in MRP or sales reporting can get you instant attention anywhere in the fast growing Sunbelt areas. $30 - $47K.

* All industries. Systems 38 is coming back. Recent IBM releases have given S/38 users new confidence. They want to hire. $18 - $38K.

Our clients are calling us regularly to keep the pressure on. These are NOW needs. The companies will pay everything: interview, relocation, temporary living expenses, fees. ..Please call collect or send your resume (or both).

(904) 398-7371
Ask for Steve

JIM KING
& ASSOCIATES
1048 Gulf Life Tower
Jacksonville, FL 32207

MOVE/STAY SOUTH NOW

Our computer can help you get here or stay here. Four WATS lines; 13 years' experience; 270 affiliated offices; 300+ current job orders; 3000+ company clients from Virginia to Texas to Florida! Send resume to:

DATA RESOURCES, USA
Division of Landrum Personnel Resources
P.O. Box 1373C
Pensacola, Florida 32589-1373
CALL TOLL FREE (800) 874-8407
IN FLORIDA (904) 434-2321 COLLECT

BANKING! BANKING! BANKING!

We handle all levels of DP positions in banking and financial institutions. If you hve 2+ years experience we need you! Call or send your resume. All fees, interview and relocation expenses are paid by the company.

Ralph Groetz
Adkins and Associates, Limited
P.O. Box 19062
Greensboro, NC 27408
919-378-1261

Accountemps puts the pro in edp PROductivity.

There's no longer a reason for data processing work to fall behind—Accountemps professionals are available on a moment's notice. Specialists in systems analysis, programming, computer operations, data entry and even word processing.

Accountemps specialists are the ideal solution when work starts to pile up—when employees are sick or on vacation—or when specific projects must be completed quickly and cost effectively. And because they're slightly over-qualified, they need little or no orientation. They get right to work and finish the job right the first time—and quickly too.

A call to any one of 80 offices in the United States, Canada and Great Britain will bring you the help you need immediately—for a day, a week, a month or longer—whenever you need them—evenings or weekends.

accountemps.
Rent an Expert℠

PROGRAMMERS & ANALYSTS
INSURANCE

A property/casualty applications background may qualify you for several interesting career opportunities with software subsidiary of major insurance company.

We are a "state-of-the-art," all IBM shop utilizing a 3083, DOS-VSE, Xerox laser printer, and up to date peripherals.

Strong background in COBOL required; Database NATURAL, ADABAS, CICS very helpful.

Competitive salary and benefits, beautiful working conditions in brand new corporate headquarters building. INTERESTED? Send letter or resume including salary history and requirements, or telephone Stan Sisson, Personnel Director at (414)458-9131.

HCC **HERITAGE COMPUTER CORPORATION**
2800 South Taylor Drive • Sheboygan, WI 53081

ROBERT HALF

CENTRAL FLORIDA OPPORTUNITIES

Being one of the most rapidly expanding technological areas in the country, we continually need well qualified data processing professionals to staff our expanding market. At the present time the most crucial positions are in the application programming area. Expertise with either IMS DB/DC, COBOL or PL1; COBOL with CICS; or UNIX operating system with C language required. Ideally individuals with 2-6 years experience are most applicable for these opportunities. If you are interested in an advancement in your career as well as good geographic location, please write or call:

Dorothea Sams

Robert Half of Orlando

P.O. Box 17892
Orlando, Florida 32860
(305) 628-2836

UNITED AIRLINES

SENIOR TECHNICAL SUPPORT ANALYST – MINICOMPUTER

United Airlines' minicomputer network is one of the most sophisticated systems of its kind. Stretching from coast to coast, this 400+ unit system has greatly expanded our data processing capabilities. And to keep pace, we are now seeking an accomplished Programmer Analyst to provide technical assistance and support for end-users.

Based in our suburban Chicago corporate headquarters, this high visibility position assists travel agencies and internal organizations in identifying and resolving hardware, software and service irregularities. The ideal candidate will have strong interpersonal and communication skills, coupled with 3–5 years programming experience in a minicomputer environment. A background in minicomputer hardware and/or operating systems is a plus.

Find out more about United's challenges, opportunities and benefits including pass/reduced fare air travel privileges. Send a resume with salary history to: Professional Employment/EXOPX-CW/KE, United Airlines, P.O. Box 66100, Chicago, IL 60666. *Equal Opportunity Employer.*

DATA PROCESSING PROFESSIONALS

Three Choice Locations For Exciting Developmental Database Projects With SCT!

- Philadelphia, Pennsylvania
- San Francisco, California
- Los Angeles, California

Join Us For The Challenge!

Here is an opportunity to work with one of the most progressive leaders in the information systems industry today...SYSTEMS & COMPUTER TECHNOLOGY CORPORATION. SCT provides software/systems support and computer resource management services to local government and institutions of higher learning throughout the U.S.

To keep pace with the technology and the changing systems within our marketplace, we are in the process of developing tomorrow's applications software at the locations shown. Join us and interact with other software professionals in exciting R&D environments.

Experience with any of these databases is a must:
• IDMS-ADSO • DMIV • ADABAS • IMS

PROJECT MANAGERS

Strong technical background and experience managing multiple projects.

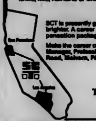
PROJECT LEADERS

Minimum of 3 years' successful project leadership experience in IBM, Honeywell or DEC systems environment, with financial applications and analysis.

PROGRAMMER/ANALYSTS

Minimum of 2 years' COBOL programming experience in on-line database environment. Knowledge of IDMS, IMS, ADABAS or CICS/TOTAL required.

Join Us For The Rewards



SCT is presently growing at a rate of more than 40+ % annually. And our future has never been brighter. A career with SCT provides real advancement potential and a very competitive compensation package.

Make the career choice that challenges. Send your resume with salary history/requirements to: Manager, Professional Recruiting, SCT, Dept. C-464, Great Valley Corp. Center, 4 Country View Road, Malvern, PA 19355, or call: (800) 441-7347. An Equal Opportunity Employer, M/F.

SYSTEMS & COMPUTER TECHNOLOGY CORPORATION
...On The Grow!

34/36/38

Programmers, analysts, consultants and managers! Salaries from $21K to $48K. I have 15 Massachusetts positions in every imaginable environment; high tech, manufacturing, transportation, finance or health care. Let me find the *one right position* for you.

Contact Susan Stanley.

SPI *Personnel Consultants*

2400 Computer Drive, P.O. Box 216
Westboro, MA 01581
(617) 366-1160

200 Affiliates Nationwide

Tomorrow

Tomorrow is taking shape today at TRW. We are beginning a major development cycle which includes projects involving every function of our business – from accounting to manufacturing to customer service and more! Because of this we are looking for a few good people in the following:

Sr. Systems Analyst/Project Leader

Technical and project management supervision of teams in the design, development and implementation of on-line systems under OS/MVS using CICS/IDMS in a multi-site environment. This position is a new development position and requires a good knowledge of manufacturing, on-line systems, design experience and project management ability. Bring your track shoes!

Sr. Programmer/Analyst

Strong CICS skills needed to assure this challenging position within our progressive environment. Environment includes 3033 MVS operating system, TSO and Panvalet. Experience with manufacturing systems and IDMS are highly desirable. Don't be shy!

We offer a competitive salary with generous fringe benefits. Please send resume including salary history to:

Bobby Reese
Employee Relations
TRW Inc.
P.O. Box 2987
Augusta, GA 30913

We are an equal opportunity employer

TRW

COMPUTER TECHNOLOGY

Search continued. Tenure track position teaching courses in computer languages and applications. Master's degree in related field required, doctorate preferred, teaching and related work experience desired. Knowledge of time-sharing and microcomputers essential. Salary commensurate with degree and experience. Date of employment by mutual agreement. Applications must include a letter stating professional career goals, resume, and names of three references. Applications will be accepted until the position is filled. Non U.S. citizens include explanation of current visa status. Apply to Dr. Jerry Wayne Brown, Vice President for Academic Affairs, Northern Montana College, Havre, MT 59501 AA/EOE.

TI COBOL PROGRAMMER

MCBA, an established author/wholesaler of Acctg./Mfg. pkgs., has a need for a Cobol Programmer with at least two - three years experience on the TI990/DX10 programming Acctg. or Mfg. pkgs. Familiarity with MCBA pkgs. a plus. Good salary and location in a suburb twenty minutes north of Los Angeles. Call or rush resume to

MCBA, 2441 Honolulu Avenue, Montrose, CA 91020, Attn: Personnel Manager; (818) 957-2900

TIRED OF THESE LONG COLD WINTERS?

Data Processing Professionals with skills in Large Systems or Minis, Database or On-Line Systems, consider a move to the beautiful SAN FRANCISCO BAY AREA.

Our clients have the most challenging and growth-oriented career opportunities California offers.

LOGICAL OPTIONS

[illegible]
[illegible]
San Francisco, CA [illegible] • [illegible]

Project Leader

Universal Health Services, a major hospital management company, has a challenging opportunity for a Project Leader to join its Corporate Information Services Department in King of Prussia, PA. Our environment includes a centralized multiple system 38 configuration using HPMS to support hospitals throughout the United States.

This position manages 5 programmers, designs systems, prepares project schedules, manages projects through implementation, oversees maintenance activities and establishes back-up and recovery procedures.

A minimum of 3 years experience on a System 38 with a working knowledge of CPF, CL and RPG III, systems security and utilities is required. Knowledge of hospital/business procedures, medical records, patient billing and accounts receivable system is required. Experience with HPMS is desirable.

UHS offers an excellent compensation and benefits package along with a generous relocation program. Please send resume and salary history to: Human Resource Manager, Dept. CW19, Universal Health Services, Inc., 367 South Gulph Road, King of Prussia, PA. 19406. Equal opportunity employer m/f/h/v.

UHS

Data Processing Manager & Systems Analyst/Programmers

Salt Lake City

Norton Christensen is a leading supplier of diamond drilling bits and related drilling equipment for the petroleum and mining industries. We are seeking a Data Processing Manager and two systems analyst/programmers to form a new data processing group to install an MRP systems. IBM system 38, RPG III, and MRP implementation experience essential. Some travel required.

We offer a competitive salary and a comprehensive paid benefits program. Submit resume to:

Joyce Fullmer
P.O. Box 26185
Salt Lake City, UT 84126

NORTON CHRISTENSEN DRILLING PRODUCTS

Equal Opportunity Employer

For Recruitment Advertising--

Computerworld is far more cost efficient than other newspapers.

Most people who read COMPUTERWORLD aren't computer people; and most computer people don't read any one newspaper. No U.S. newspaper reaches more than 121,500 Data Processing people, even by the most generous estimates. *Computerworld*, on the other hand, is read by an estimated 344,300 professional DP/MIS people each week in the U.S.

To place your ad, or to get a 1984 rate card with complete details on Computerworld Classified Advertising, call or write:

Computerworld Classified Advertising
P.O. Box 880, 375 Cochituate Road
Framingham, MA 01701
(617) 879-0700; (800) 343-6474

ALLIED Medical Group are leading British health care consultants to the large and prestigious Riyadh Al Kharj Hospital Programme.

The multi-machine installation that serves the Programme is remarkably sophisticated, with a network supporting a mixture of on-line and batch systems for accounting, patient and management information, laboratory engineering and administrative applications.

The hardware consists of an array of kit from top manufacturers — a Honeywell L66/10 3 × HP 3000 (soon to include a Series 48) and a CDC CYBER 18/20. Software used includes IDS1, TDS, GCOS3, GMAP, IMAGE VIEW, COBOL, FORTRAN and SPL.

The Programme is in the midst of preparing a long range computer strategy, which will involve a major expansion of the network and significant restructuring and expansion of the application systems. To play a significant role in this process, we are now urgently seeking two high calibre professionals to join the team:

Develop the long-range systems strategy or one of Saudi Arabia's leading hospitals

Systems and Programming Manager

$44,900

Reporting to the Director of Computer Services, you'll be expected to play a leading role in the development and implementation of the long-term computing strategy as well as being responsible for the support of existing systems.

We need a graduate, aged 35+, with at least 10 years experience — including either 3 years as a Systems and Programming Manager or 5 years project management experience. Extensive health care experience in a large hospital environment, including systems implementation and experience in the preparation of strategic plans, are essentials. Membership of a data processing and/or health care professional organisation would be an advantage.

Quote Ref: P/RKH/3055/CW.

Systems Software Specialist

$36,300

Your task would be twofold — to modify and maintain highly complex OS and support software; to incorporate the latest engineering releases and utilities from a number of manufacturers; and to be responsible for applications which impact on the overall operating system, such as file maintenance routines, telecoms software and mathematics and scientific software packages.

You'll need a first degree or equivalent in Computer Science or Math and your experience of at least four years in the computing industry must include one year of direct responsibility for manufacturers' OS software.

Quote Ref: P/RKH/3039/CW.

The salaries quoted for these married status, two year contract basis posts (based on approximately 3.55 SR — $1) include a gratuity of one month's salary for every twelve months satisfactory service — payable at the end of your two year contract.

The comprehensive benefits package, includes: free, fully furnished accommodation; four weeks leave for every six months service; free air fares (including leave flights) and extensive welfare and recreation facilities.

For further details please write enclosing a full career resume to: Theresa Sutherland, Senior Personnel Officer, Allied Medical Group, 12/18 Grosvenor Gardens, London, SW1W 0DZ, England. Please quote the appropriate reference number on all correspondence.

Allied Medical Group

EDP AUDITOR

San Diego Gas & Electric is seeking an experienced EDP Auditor for its Corporate Internal Auditing Department. Candidates should have:

- Minimum 2 years of EDP audit experience;
- Experience with IDMS;
- Understanding of Audit and Data Processing Philosophies and knowledge of computer hardware and software;
- BS degree required and certificate as a CDP, CISA or CIA desirable;
- Excellent oral and written communication skills.

Please submit resume to:

EMPLOYMENT OFFICE

SDGE

San Diego Gas & Electric

P.O. Box 1831
San Diego, CA 92112

Affirmative Action/Equal Opportunity Employer

SOUTHEASTERN ALASKA - CITY OF KETCHIKAN

Gateway to Alaska-Haven for fishing, sightseeing, hiking, boating

Progressive City with an IBM System 38, Mdl 8 has openings for two Analysts/Programmers. Work includes payroll, accounting, taxes, electric and telephone billing, new Police applications, and telephone and electric continuing property records.

The City of Ketchikan is presently accepting applications for the positions of Analyst/Programmer in the Data Processing Division. Duties include system analysis, programming and operating an IBM System 38. RPG III knowledge and programming experience is a plus. Minimum entry level salary is $2500 per month. Interested applicants should submit resume, references, salary requirements and work history to City Finance Department, Data Processing Division, 334 Front Street, Ketchikan, Alaska 99901 no later than 5:00 pm, December 7, 1984. The City of Ketchikan is an equal opportunity employer.

D P PROFESSIONALS COME TO THE BEAUTIFUL PACIFIC NORTHWEST

The most livable region - Seattle/Portland - temperate climate, clean air, outdoor activities.

D P DIVISION

Applications Pg Mgr - New IBM [illegible] Large Scale IBM	to $40K
Systems Programmers MVS, DOS/VSE, VM, VS1, CICS or IMS	to $41K
Application/Designer with CICS, DL1 & IMS DB/DC experience	to $38K
IMS DB/DC P/A's Banking to MFG or Retail	to $38K
CICS P/A's Banking to Mfg or Retail	to $38K
Univac 1100 P/A's, Cobol and DMS or CMS to Mapper - Portland	to $32K
Honeywell P/A's large systems, Cobol-Portland	to $30K
P/A's - Retail/Distribution experience req'd, Cobol	to $35K

Technical Division

SFTWR ENGRS - Data Systems - Develop all levels - VMS, C-1, Cyber, Unix, RMX 86	$30K-$60K
Artificial Intelligence - Lisp, Prod Dev	to $70K
Tech Analyst - Tandem, Sys Software Maint, Cap. Plng.	to $35K
Dir of Com - Voice/Data comm mgmt, strong mgmt skills, 10 yrs exp	to $55K

HOUSER, MARTIN, MORRIS ASSOCIATES
Box C-90015
Bellevue, WA 98009
(206) 453-2700
All fees employer paid
Member of NCA

ENGINEERING - Assistant to Dean Engineering Computing. Position carries responsibility for the operational status of the computing system; assist faculty with the development of computer programs for educational and research application, provides faculty with information related to computer software and hardware availability, and advises on such acquisitions in liaison with computer services. Additional duties include scheduling usage of the computing system, coordinating engineering college computing needs with the university computer services department. Minimum qualifications: PhD degree in Engineering or related area; strong background in minimum computer operations and engineering systems programming. Preferred qualifications: operating systems experience; real-time computing experience; college level teaching experience. Send resume and reference information, to Anthony [illegible], Dean, College of Engineering, CLEVELAND STATE UNIVERSITY, 1983 E. 24th Street, Cleveland, Ohio 44115. An equal opportunity employer, m/f/h.

Gold Circle

MANAGER, INFORMATION SYSTEMS

GOLD CIRCLE, the progressive, $600 million division of the multi-billion dollar Federated Department Stores, boasts one of the Midwest's most technologically advanced IBM shops — serving our 51-store, 4-state retail network. Our stimulating environment incorporates an IBM 3081 mainframe, MVS-SP operating systems, and a variety of innovative projects and challenges. We're currently seeking two results-oriented managers who will oversee and direct activities of Project Managers and their teams as they develop financial or point-of-sale and merchandising support systems.

These positions require a thorough working knowledge of large scale IBM mainframes, COBOL programming, structured life cycle development methodology, and applications development. The successful candidates will have a related college degree or equivalent work experience; excellent leadership, planning and communication skills, and preferably, exposure to an OS environment. Experience with IMS data base management and prior experience in the supervision of project managers would be helpful.

MANAGER, FINANCIAL SYSTEMS

Experience in the development of accounts payable systems, personnel-payroll systems and general ledger systems is required. Exposure to automated invoice match and accounts receivable systems as well as MSA packages would be considered a plus.

MANAGER, POINT-OF-SALE & MERCHANDISING SUPPORT SYSTEMS

Experience in the development of inventory management and sales capture and reporting systems is required. Knowledge of point-of-sale and merchandising systems as well as a background in applications development in a retail or manufacturing operation would be helpful.

To learn more about the Gold Circle challenge, our progressive compensation program that includes an excellent relocation package, and the exciting, affordable life-style in a new era of growth for Columbus — our state's largest city, CALL Julie Smith COLLECT at (614) [illegible] or send your resume in confidence to: GOLD CIRCLE STORES, Executive Placement, Dept. T, P.O. Box [illegible], Worthington, Ohio 43085.

1984

Data Processing Professionals

Build Your Future With The Computer Dynamics Professionals

There's a new era in data processing. And staying ahead of the technological advancements in hardware and sophisticated software development is no easy task.

But Computer Dynamics, Inc. is staying ahead, and rapidly expanding as we meet the data processing needs of our clientele — nationwide. Our 15 years' experience in the consulting, systems design and programming industry has provided us with the expertise and resources that few companies have.

If you're a data processing pro with desire to build a solid, successful career with an innovative pioneering leader, get acquainted with the Computer Dynamics professionals. Due to our wide ranging career opportunities and project assignments, we're looking for self-motivated, experienced team players who wish to expand their professional talents...from **IBM/IMS, Model 204 Programmers to CAD/CAM graphics** programmers and many other positions.

For more information on building a long-term, successful career as a **COMPUTER DYNAMICS PROFESSIONAL,** call collect or send your resume to the Computer Dynamics' office of your choice:

DETROIT
29792 Telegraph Rd.
Southfield, MI 48034
313/357-4200

HOUSTON
710 N. Post Oak Rd., #308
Houston, TX 77024
713/683-0134

DALLAS
4100 Spring Valley Rd.,
Suite 400
Dallas, TX 75234
217/788-2020

LOS ANGELES
6319 DeSoto Ave., #406
Woodland Hills, CA
91367
213/710-0234

FT. LAUDERDALE/MIAMI
6250 North Andrews Ave., #102
Ft. Lauderdale, FL 33309
305/492-9745

COMPUTER DYNAMICS, INC.

Equal Opportunity Employer M/F

ADVANCE YOUR CAREER... AND MOVE SOUTH!

SALARIES FROM $30K to $40K

Major sunbelt banks undergoing massive expansion need qualified EDP professionals with experience in large scale IBM on-line systems. Several positions available:

- Programmer/Analysts
- System Analysts
- System Programmers
- Tech Support
- Telecommunications
- Tandem Programmers

GIVE YOUR CAREER A BOOST - MOVE SOUTH AND ENJOY A NEW CAREER AND A NEW LIFESTYLE. Locations Available include (partial list):

- ATLANTA
- CHARLOTTE
- JACKSONVILLE
- RICHMOND
- NEW ORLEANS
- ORLANDO
- ROANOKE
- WINSTON-SALEM

All fees including interviewing and relocation are paid by our client companies. Confidence assured.

Send resume to:

Kelly Davidson - Banking & Insurance
Susan Lankford - Manufacturing
(904) 725-0667

Advanced Recruiters INC.

P.O. Box 17480
Jacksonville, FL 32245-7480

PROGRAM MANAGER

Now accepting applications for a Program Manager. Candidate must have at least 4 years experience in system design with a minimum of 1 year on an IBM 38. Supervisory experience a must.

Position offers excellent salary plus a comprehensive benefit package. Send resume to:

VISUAL GRAPHICS CORPORATION
5701 N.W. 94th Avenue
Tamarac, FL 33321

Equal Opportunity Employer M/F

SENIOR DEVELOPMENT PROGRAMMER IN BEAUTIFUL VERMONT

Position available in expanding, established software development firm. Must have at least two years experience in systems programming or in either 68000 or 8088 assembler languages. Macintosh programming experience, micro-mainframe communications, and good PASCAL a major plus. Must be able to plan and program software systems.

Salary commensurate with experience. Fulltime, available now. Send resumes and 3 references to:

Tom Evslin
Solutions, Inc.
Box 989
Montpelier, VT 05602

M.I.S.

SYSTEM SUPPORT SPECIALIST TELECOMMUNICATIONS

St. Joseph Mercy Hospital is a progressive 312-bed acute care facility located in North Central Iowa. We are currently seeking an individual for a position within our Management Information Systems Department as a Systems Support Specialist in the area of telecommunications.

This individual will be responsible for the installation and on-going management/maintenance, and enhancement of the various order communications, office automation, local area network, and information center systems.

The successful candidate will possess an M.B.A. or masters level computer science degree, or a bachelors degree in the same with 3 years of job related experience preferably in the health care environment.

This is an excellent opportunity with a very competitive salary and full benefit package. Interested applicants please send a personal resume and salary requirements in confidence to:

Personnel
St. Joseph Mercy Hospital
84 Beaumont Drive
Mason City, Iowa 50401
An Equal Opportunity Employer

FLORIDA

OPENINGS ARE NOW!

TECHNICAL	
SYS PROG-MVS-SYSGENS	to 38K
TELECOM - VOICE - DATA	to 40K
TECH SUPPORT-IMS DB/DC	to 35K
TECH SUPPORT - VM	to 40K
CAPACITY PLANNER	to 38K
PERF MEAS & TUNING	to 42K
APPLICATIONS (BPS or ACCTG)	
P/A-DOS/VSE-CICS	to 28K
P/A-SYS 38-RPG II or COBOL	to 30K
P/A-MVS-COBOL-CICS	20-28K
DBA	
IDMS or IMS	to 40K
MODEL 204	to 40K
BANKING	
PROG/ANAL-HOGAN	25 to 40K
PROG/ANAL-BURR or IBM	18 to 30K
MANAGEMENT	
PROJ LDR - DOS/VSE - INSUR	to 30K
MGR - DOS/VSE - HVY ACCTG	to 40K
ASST MIS - MVS- ACCTG	to 30K
MIS Mgr - DOS/VSE - CICS	To 30K

Many others to choose from,
Call or send resume to:
STAN ALLEN
ROBERT HALF
OF TAMPA, INC.
1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4161

IBM - SALES

Established dealer looking for top quality sales person with a proven track record in IBM hardware. Offering above average commissions and all the amenities of Florida's Sun Coast. Call 813-722-4534. All replies confidential.

DATA PROCESSING PROFESSIONALS

Overseas Positions

Put yourself on a technical fast track with these unique opportunities available as a result of continued expansion and an industry position of technical leadership. You will participate as a key team member in the development of this state-of-the-art Data Center.

SYSTEM PROGRAMMER - $60,000. Principal activities will include operating system conversion and modifications, performance tuning and system programmer training, in this MVS-JES-2 operation. Additional responsibilities will be sysgens and problem determination. MVS/XA experience helpful.

CAPACITY PLANNER - $55,000. Responsibility will be workload forecasting, impact analysis, hardware planning and Usage/Service reporting. Candidate should have knowledge of Best/l, SAS, and MICS. This highly visible position offers an excellent opportunity for increases in responsibility.

NETWORK SYSTEM PROGRAMMER - $60,000. Responsible for network software including problem determination, planning, training of software staff, and network operators. You will utilize TSO, ISPF, ALC, VTAM, NCP, SNA/SDLC, and be responsible for 3705 GENS. VCNA and RSCS experience will increase your upward mobility.

DASD MANAGEMENT ANALYST - $60,000. Join a key management team and define advanced policy and procedures. The ability to articulate "hands-on" knowledge of Mass Storage Systems, HSAM, SAS, and TSO/ISPF is a key element of this position. A knowledge of ISAM II and ACF-2 is a plus.

SOFTWARE ANALYST - $55,000. Responsibilities will include strategic planning, office automation evaluation, analysis of user requirements, preparation of feasibility reports, system justifications and implementation planning. Candidate should have knowledge of Wang & IBM product lines.

SYSTEM COORDINATOR - $60,000. Responsible for system implementation strategies in this major IBM/IMS installation. Use your broad based knowledge of system technologies, project management, and staff training procedures for this challenging and rewarding position.

Compensation consists of a base salary plus approximately 40% expatriate premium and an overseas cost differential. Candidates interested in additional information should call (713) 629-6661 or send resume to:

RICHARD, WAYNE AND ROBERTS
Data Processing Recruiting Specialists
24 Greenway Plaza #1304-CW
Houston, Texas 77046

Programmer Analyst

Philadelphia based

Aydin Controls is the pioneer and world leader in the development of color graphics and display products. To support the continued growth of our divisions, we are seeking an individual with a minimum of 2 years experience on microdata or PICK operating systems. Experience in a manufacturing/MRP environment is preferred.

We offer an excellent starting salary and benefits package. For further information, call or send resume to: **Mr. Bruce Krangel, 215-542-7800, Aydin Controls, 414 Commerce Drive, Ft. Washington, PA. 19034.** Equal opportunity employer M/F.

LOOKING?

Find the job you want in Computerworld's classifieds. No other publication carries as many ads for computer professionals as Computerworld, so no other publication can give you as wide a choice of jobs, salary and location as Computerworld. You can even try a "Position Wanted" ad to look for exactly what you want, where you want.

Be sure you look over our recruitment ads every week, so you don't miss the opportunity that's just right for you.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
375 Cochituate Road, Box 880, Framingham, MA 01701/(617) 879-0700

Turn It On!

Systems Programmer

Turn on the brainpower! Our start-up operation could be the challenge of your new career. Our VAX 11/780 has been installed since July 1983 and we're designing and implementing state-of-the-art systems to support our rapid growth.

Turn on the energy! Lee County Electric Cooperative is the largest and fastest growing utilities co-op in the country. The pace is quick; the staff is young; the management is progressive. And there's a future here for you.

Turn on the know-how! You will be a Systems Programmer with at least 2 years of related experience and a BS in CS or Business Administration. The Systems Programmer must have experience in VMS, RMS, BASIC, and RMS. Other softwares such as COBOL, FORTRAN, MACRO, DIBOL, and CDD/DTR is desirable. Good oral and written communication skills are necessary.

Turn on the good times! Lee County on Florida's Gulf Coast, one of the fastest growing areas in the U.S., is a paradise for sports enthusiasts. The climate is mild year 'round, and the people are warm and friendly.

Turn on the response! We offer competitive salaries, complete benefits including medical, dental, pension plan, tuition reimbursement and relocation assistance. For immediate consideration, call Linda Lawson, Manager, collect, (813) 995-2121. In Florida call Toll Free 1-800-282-1643. Or write: Manager, Human Resources, Lee County Electric Cooperative Inc., P.O. Box 3455, North Fort Myers, Florida 33903. An Equal Opportunity Employer, M/F.

LEE COUNTY ELECTRIC COOPERATIVE INC.

NEW ENGLAND

BOSTON

INVEST. SYS. CONSLT.. $50,000

Leading invest. firm seeks articulate systems pro to define future apps. IBM MVS DBMS environ. Oppty. to apply your trust, portfolio mgmt. or mutual funds exp. in hi-visibility position.

MFG. SYS. ANALYST $36,000

Prestigious mfg. mfr. seeks polished analyst for new mfg. apps. Diverse technology incl. IBM OS mainframes + minis & PC's. Exciting fast-track oppty. to enhance your tech. & applications exp.

PROVIDENCE

ADABAS ANALYST $38,000

Hi-tech software devel. oppty. Strong relational data base mgmt. sys. exp. req'd. ADABAS knowl. & fourth generation language (Natural) desired. Proj. mgmt. & data base analysis respons.

HARTFORD

TELECOMM'S To $48,000

Join a rapidly expanding nat. corp. in T.P. software capacity! IBM VTAM, NCP tech bkgrd. req. for this lge. IBM network data center. Will work closely w/IBM personnel in state-of-the-art planning.

ROBERT HALF

EDP PERSONNEL SPECIALISTS

Contact the Manager of any office listed below.

100 Summer St., Boston, MA 02110
(617) 423-1200
111 Pearl St., Hartford, CT 06103
(203) 278-7170
900 Turks Head Bldg., Providence, RI 02903
(401) 274-8700

Client Companies Assume All Fees.

ACADEMIC DEPARTMENT HEAD

Applications are invited for department head, Computer and Office Information Systems. The department has 12 faculty members with programs in Computer Information Systems, Office Administration, and Business Education. The University has 11,500 students, including 2,400 in AACSB-accredited business programs. Candidates must possess good communication skills and successful teaching experience. Desirable qualifications are a doctorate in CIS, MIS, or related field; business experience related to computer/office information systems; publications; and administrative experience. Salary and rank are commensurate with qualifications. (Note: Faculty positions also available.) Send resume, transcripts, and letters of reference to Dr. Van McGraw, Dean, College of Business Administration, Northeast Louisiana University, Monroe, Louisiana, 71209. An EO/AA employer.

ATTENTION BUSINESS & SCIENTIFIC MIS PROFESSIONALS

Why Should You Consider A Career With ICI Americas?

Challenge/Recognition/Career Growth

These are just a few of the many advantages of working for ICI Americas (1983 sales exceeded $1 billion), the U.S. subsidiary of a major multi-national corporation. If you would like non-routine assignments, creative problem solving, and the opportunity of working with top-notch professionals on meaningful projects, we would like to hear from you. Due to our rapid growth, several new positions have been added to our dynamic corporate MIS Department. These positions support all major business functions including manufacturing, marketing, finance, and R&D throughout the Company.

Sr. Business System Analyst — 5+ years experience including project responsibility for implementation of manufacturing, financial or marketing systems in a large IBM mainframe environment. Experience in MRP II, DRP, Quality Control, or Automated Warehousing is a plus.

Sr. Scientific Analysts — The positions require individuals with 3 to 5 years of experience in one of more of the following: development of structure activity relationships, computational chemistry, chemical graphics, applied statistics, chemical data management, instrument interfacing and laboratory information systems. An advanced degree in the physical sciences, and VAX/VMS experience are preferred. FORTRAN experience is essential, as well as strong verbal and written communications skills.

Programmers/Analysts — Excellent advancement opportunities for people with 2+ years in OS/MVS, COBOL, TSO/SPF or DOS/VSE and CICS/DLI in programming complex business, financial and marketing systems.

Data Base Analyst — 3 or more years data processing experience with a working knowledge of IMS DB/DC and either COBOL or assembler, as well as IMS backup/recovery utilities.

Operations Research Analyst — BS in OR or Business, Industrial Engineering with major in OR, MS or MBA preferred. Minimum three years of experience in applying OR techniques such as LP, Forecasting, Econometrics, Financial Modeling, Simulation, Statistic or Decision Analysis. Experience using FORTRAN, SAS and Financial Model languages (FCS, 1-2-3) a definite plus; looking for results-oriented individual.

OS/MVS Systems Programmer — 3-5 years of solid MVS operating system support experience, including system generation, maintenance (SMP) and program product installation. A good knowledge of TSO, ISPF, ACF/VTAM and SAS is preferred with exposure to either IMS/VS or CICS/VS a definite plus.

Information Center Positions — Mature IC has positions for Personal Computer Programmer Analyst and Time-sharing Technical Consultant (project leader). Experience required in fourth generation languages (SAS, FCS, INQUIRE) and PC software (BASIC, C, 1-2-3 or PASCAL). Both positions involve hardware and software evaluations and user support.

These positions are located at our corporate headquarters, a campus-like complex in suburban Wilmington, DE. ICI offers salaries fully commensurate with the required experience, excellent benefits including a generous relocation policy and ample growth opportunities. Delaware, "the small wonder" state, offers cosmopolitan living without the high costs and other drawbacks of big city living. Why not invest 20 cents in your future by sending your resume including salary requirement, in confidence to: **James H. Kline, Dept. CW-19, ICI Americas Inc., Wilmington, Delaware 19897.** *An Equal Opportunity Employer M/F*

ICI Americas Inc.

[illegible]

[illegible]

Mark Young, CPC (704) [illegible]

Corporate Personnel Consultants, Inc.

3725 Latrobe Drive, Suite 310
Charlotte, N.C. 28211

UNIX + C LANGUAGE

$35,000 - $50,000

Advanced Programming Resources, Inc., a dynamic growth oriented Contract Services organization specializing in Consulting Systems Design and Programming Development, has an immediate need for advanced Software Engineers.

Must have a degree in Computer Science or Electrical Engineering, 2 or more years programming experience using "C" Language, PASCAL, or PL/1, UNIX Operating System. Working knowledge of Network Protocol and multiprocessor systems helpful. Knowledge of VAX or other mini computers required.

APR provides above average benefits and compensation. If you feel you want to join the leader, please send your resume' in confidence to:

APR

ADVANCED PROGRAMMING RESOURCES, INC.

6000 North High Street • Worthington, Ohio 43085 • 614/885-3600

"An Equal Opportunity Employer"

Senior EDP Auditor

Large electric utility corporation with centralized data center and four remote sites is seeking an experienced Senior EDP Auditor. Job responsibilities include:

- Participate in development of annual EDP Audit Plan
- Prioritize and schedule assigned audit projects
- Plan and accomplish or supervise accomplishment of assigned audit projects
- Review fieldwork performed by subordinates
- Prepare or review resulting audit reports.

Should have professional certification and B.S. in Computer Science or business related field with minimum of three years EDP Audit experience in an MVS environment utilizing ACF2, TSO, ROSCOE, CICS and IDMS.

Please mail resume and salary requirements to the Employee Relations Department. Principals only.

Central and South West Corporation

P.O. Box 220164 • Dallas, Texas 75222

Central and South West Corporation is one of the nation's leading electric utility systems, having annual revenues of more than $2 billion. With corporate headquarters in Dallas, CSW serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

Equal Opportunity Employer

Intertech (International American Technologies Corp.) is seeking individuals for Saudi Arabian assignments. These single status contracts are 54 weeks and renewable and pay up to 50K base salary per year, tax free. Benefits include housing in 5-star hotels, per diem, 5 weeks vacation with paid transportation, sick pay, free medical insurance, air conditioned company car, and paid overtime. Must be a U.S. U.K. or Canadian citizen.

Systems Analysts and Programmers

(Degree Preferred, Not Required)

- 4-5 years program product installation support experience with CICS/VS, MVS, IMS/VS DC and DISOSS.
- 3 years experience installing and maintaining program products in large MVS environment such as Panvalet, Panexec, Apollo, TMS, Speakeasy, Telegraph, SAS and Compilers.
- 2-3 years IMS/VS experience on IBM mainframe MVS/JCL, DBD and PSB utility coding, TSO/SPF, IMS DB/DC data dictionary, DBRC SIMU/II and VSAM.
- 2-3 years CICS/VS with IMS/DB, IBM mainframe MVS/JCL, including DBD and PSB coding and generation, VSAM SIMU/II and IMS/DC experience.
- 2-3 years M204 database experience.

Send your resume to Will Gordon

Intertech Corporation
2 West Potomac Parkway
Williamsport, MD 21795

Candidates interested in other positions in Saudi Arabia should send their resumes for numerous other opportunities currently available.

Equal Opportunity Employer

INTERTECH

INTERNATIONAL AMERICAN TECHNOLOGIES CORPORATION

FLYING J, INC. is a growth oriented, fully integrated petroleum marketing company located in scenic Northern Utah, where recreational opportunities are abundant and a clean, friendly, yet exciting environment awaits. We offer a competitive salary and an excellent benefit package for aggressive hard-working DP personnel.

Systems Programmer: We are seeking an individual with 4-6 years of IBM VM and DOS-VSE experience. Communication and CICS skills desirable. A technical degree is a real plus.

Programmer Analyst: The ideal candidate will have 4-5 years experience in an IBM DOS-VSE environment, have a business or DP related degree, communicate well with users and perform effectively with minimum supervision. CICS, GENER/OL, C and UNIX skills desirable. Send resume and salary requirement to:

DP Manager, Flying J Inc., P.O. Box 678, Brigham City UT 84302.

Programmer/Analyst needed to analyze accounting business procedures and problems in manufacturing environment to refine data and convert it to programmable form. Participate with user departments in developing reporting or processing systems to meet user requirements. Encodes all program logic to meet new use requirement. Performs investigative research to identify software problems which are causing operational or reporting problems. Direct and/or perform system day-to-day operations for processing and report generation. Document existing or new software. Requires a Bachelor's degree in business administration/computer science and one year experience in job offered or one year directly related programming experience. Must have experience with COBOL. Must have experience with accounting or manufacturing processes. Must have at least 18 credit hours in computer science. 40 hour work week. $21,000 per year. Apply at the Texas Employment Commission, Dallas, TX, or send resume to the Texas Employment Commission, TEC Building, Austin, TX 78778. Job Order No 3950588. Ad paid by an equal employment opportunity employer.

PROGRAMMER/ANALYST

3M's Orthopedic Products Division has an opening in its Fairlawn facility for a person with 2-3 years experience with:

- HP3000 or
- Order Entry or Manufacturing Systems

Salary commensurate with experience. For consideration send resume and salary history to:

Personnel Department
3M
20-01 Pollitt Drive
Fairlawn, NJ 07410

We are an equal opportunity employer M/F/V/H.

IBM 38 SOUTHERN OREGON

Programmer/analyst for design, implementation and maintenance of programs and systems for a progressive county government. Requires backgound, knowledge and experience with IBM systems using RPG language. Degree desired with at least 2 years compatible experience. Salary range: $21,400-$24,900 plus liberal fringes. Send resume to County Administrative Office, Jackson County Courthouse, Medford, OR 97501. EOE.

APPLICATION PROGRAMMERS

Do you have experience with PDP/RSX11M or VAX/VMS? We're looking for candidates with 5 years experience solving problems in the fields of civil engineering, mapping and architecture. We need FORTRAN programmers to help speed the growth of our CAD systems. We can offer excellent salary and opportunities for growth. Please send resume to: Mid States Engineering, Jennifer Kettler, 941 North Meridian, Indianapolis, IN 46204. EOE.

SYSTEMS ANALYST/ ASST. PROJECT LEADER

- Analyzes systems specs & develops program specs. Design files/report layouts. Evaluates & modifies systems. Manages subsystems of project. Must have 4 yrs exp in job offered or 4 yrs exp as a Sr. Programmer. Exp must include use of COBOL & design/analysis of variety of complex systems in on-line environments. Must have prior exp supervising programmers. 40 hrs/wk, 9-5PM; $31,700/yr; Cincinnati, Ohio reporting location. Send resumes to: Ohio Bureau of Employment Services, 1915 Central Parkway, Cincinnati, Ohio 45214. J.O. #0565856.

Bentley College

FACULTY POSITIONS IN COMPUTER INFORMATION SYSTEMS

Full-Time and Part-Time

Bentley College is seeking faculty for its expanding graduate (270+ majors) and undergraduate (800+ majors) degree programs in computer information systems. Applications are encouraged from individuals with industrial and/or teaching experience who have a commitment to teaching excellence in any of the following areas:

- Data Communications
- Database
- System Analysis and Design
- Decision Support Systems and Expert Systems
- Software Development

Doctorate in hand or near final stages of completion is preferred. Consideration will be given to master's degree holders with experience who intend to pursue the doctorate. The Computer Information Systems Department currently consists of 28 full-time and 18 part-time faculty.

The computing facilities include 400 microcomputers and a network of five Prime super-minis.

Call (617) 891-2906 for a detailed position announcement or apply by sending a current resume to:

Dr. Donald R. Chand, Chair
CIS Department
Bentley College
Beaver and Forest Streets
Waltham, MA 02254

An Equal Opportunity, Affirmative Action Employer

LEAD SYSTEMS

A leading producer of enamel papers for the printed communications industry has an excellent opportunity available in Central Wisconsin. This person reporting to the software support manager will design, modify, maintain and install operating systems, communication systems and vendor supplied software on an IBM 4381 machine. This person carries out the most complex, highly technical systems programming work; provides training to others; analyzes and corrects problems; provides complete documentation; participates in post audit analysis; and provides user support.

B.S. degree in Computer Science, Math, Business Administration or related area and at least 3 years of advanced-level systems programming experience with MVS and CICS.

Excellent employee benefits. Liberal relocation program. Send resume and salary requirements to:.

Bert E. Johnson
Professional Employment Manager
CONSOLIDATED PAPERS, INC.
P.O. Box 50
Wisconsin Rapids, WI 54494
NO THIRD PARTY INQUIRIES, PLEASE
An Equal Opportunity Employer M/F/H/V

Consolidated

HIRING?

More computer people read Computerworld than any other newspaper in the United States - more than half a million computer people every week. Among our 529,650 readers at user organizations, about half claim to look at recruitment ads at least every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld Classifieds, call or write:

Classified Advertising
Computerworld
Box 880
Framingham, MA 01701

1-800-343-6474 ——— 617-879-0700

TECHNICAL WRITER

To research, write, edit and develop documentation to support Project Athena, a major experiment to integrate computers into the educational process at M.I.T. Will write user documentation, public relations material, systems documentation. Requires Bachelor's degree and excellent communication skills. Experience in preparing technical documentation for non-technical users in university setting helpful.

Send 2 copies of resume and a writing sample to: Ms. [illegible], MIT Personnel Office, E19-239, 77 Massachusetts Ave., Cambridge, MA 02139. Attn: Job Number [illegible]. MIT is an equal opportunity/affirmative action employer.

MIT

SUNBELT
IMS

California to Florida

Immediate need for application and software IMS, CICS, IDMS, RAMIS, TOTAL and ADABAS professionals. Coast to coast coverage. Contact us now and make harsh winters a memory! Relocation assistance available.

Call Collect or Send Resume

SUPERIOR RESOURCES

Personnel Services - Employer Retained

6016 Fallbrook Ave., #[illegible]
Woodland Hills (Los Angeles) CA 91367
(818) 884-[illegible]

Member National Computer Assoc.
Offices Nationwide

CALIF. & UNIX*

Openings in a variety of areas and disciplines.
(714) 891-UNIX*

CPU COMPUTER PROFESSIONALS UNLIMITED, agency
7411 Garden Grove Blvd.
Ste. B, Garden Grove, CA 92641
*UNIX is a trademark of Bell Laboratories

We're Hiring Data Processing Professionals

Central and South West is a two plus billion dollar electric utility holding company offering competitive salaries, excellent benefits and stable working conditions. Our Information Services Department, as host center, provides services in a multi-company environment.

Our primary system software is MVS/SP1 with JES2. Additionally we use TSO/SPF, COBOL ROSCOE, and Command Level CICS. Our data base is IDMS. We were recently chosen to be one of Cullinet's beta sites for their new development software! We use Cullinet's 4th generation languages—ADS/O, OLM, CULPRIT, etc.

Each of our current openings needs people with proven analytical skills and user interface experience in addition to technical knowledge and abilities.

If we're the type of company you are seeking, and your experience is from a similar environment, please send your resume *and* salary requirements to the Employee Relations Department. Principals only.

Programmer/Analyst
(Business Applications)
Typical project assignments include construction project management, land management system, corporate shareholder system, etc.
Will provide technical expertise in system design, problem determination and system maintenance efforts. Should have JCL skills and online experience (CICS, VSAM) plus exposure to data base concepts.

Sr. Programmer/Analyst
(Engineering Applications)
Multi-project assignments offering multi-company exposure will include CAD/CAM, VM/CMS, transmission design, etc.
Will provide scientific/engineering expertise in system design and implementation efforts. Should have prior scientific/engineering application experience plus IDMS experience.

Programmer/Analyst
(Engineering Applications)
Initial assignment to the mining information management project will result in the development of a total, stand-alone system using state-of-the-art technology.
Will provide online and data base technical expertise in system design and problem determination efforts. Should have related technical skills developed from manufacturing related assignments. IDMS, ADS/O experience important.

Central and South West Corporation
P.O. Box 220164 · Dallas, Texas 75222

Central and South West Corporation is one of the nation's leading electric utility systems, having annual revenues of more than $2 billion. With corporate headquarters in Dallas, CSW serves more than four million people through its operating companies in Texas, Oklahoma, Arkansas and Louisiana.

Equal Opportunity Employer

The Missing Piece(s)?

A career isn't easy to put together. Often it's a matter of making do with inadequate pieces. But you're worth more than that.

At CONSULTANT SYSTEMS we've taken excellent compensation and fringe benefits and added:

- **Professional Environment**
- **Variety of Assignments**
- **Visibility on Important Projects**
- **Enhancement of Existing Skills**
- **Advancement Based on Performance**

We are seeking:

- **Programmer/Analysts**
- **Senior Programmer Analysts**
- **Telecommunications Analyst**

Openings in many areas of the Continental U.S. Skills in one of the following areas are a plus: CICS, ADABAS, Honeywell DM4TP, NATURAL, IMS DB/DC, TOTAL-/TIS, DEC VAX.

Call COLLECT or submit resume to: Robert B. Fields, Corporate Project Staffing, Consultant Systems, Inc., P.O. Box 14188, Pittsburg, PA 15236. Collect (412) 795-6500.

An Equal Opportunity Employer M/F
Subcontractors are welcome to reply

CONSULTANT SYSTEMS, INC.

INTERVIEW IN FLORIDA NOW!

Major Florida companies continue to expand. Needs include: PROGRAMMER/ANALYSTS and SYSTEMS ANALYSTS with IBM mainframe exp. using COBOL or ASSEMBLER. Major pluses are Banking or Financial exp., MSA or DATABASE exp.

Also need SA with Burroughs to IBM conversion exp.

Excellent opportunities for System 38, RPG III, Programmer/Analysts.

Systems Programmers

Need OS/MVS Systems Programmers. Pluses include CICS Internals, IMS, VTAM and/or Performance Tuning exp.

Send confidential resume to: Management Recruiters of St. Petersburg, 7901 4th St. N., Ste. 307, St. Petersburg, FL 33702. (813) 577-2116.

SENIOR PROGRAMMER ANALYST

Sutter Community Hospitals, a progressive multi-hospital system, seeks a dynamic individual with previous demonstrated experience in payroll/Human Resource computer applications. Qualified candidates will possess a BA/BS in Computer Science, MIS, or equivalent; experience with COBOL required. Prior demonstrated experience with McCormack & Dodge HR/payroll system implementation in an OS/MVS health care setting is desired.

Contact:

Julie Holliday, Employment Mgr.
SUTTER COMMUNITY HOSPITALS
2600 "L" STREET, SUITE 104
SACRAMENTO, CA 95816

EOE M/F/H

EDP SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS

Saudi Arabia

Saudi Consolidated Electric Company (SCECO) is responsible for the generation, transmission and distribution of power in the Eastern Province of Saudi Arabia. There currently exists a need for qualified, **degreed** EDP professionals to work in SCECO's modern computer center in Damman, Saudi Arabia.

SYSTEMS PROGRAMMERS

Requires 4 years experience in the installation, generation, maintenance, debugging and tuning of operating systems software - MVS/SP, JES 2, IMPS, DB/DC, VTAM, NCP, TSO and other related program products.

SYSTEMS ANALYSTS/ INSTRUCTORS

Requires 4 years experience in providing training in programming, systems analysis, and other data processing related topics. Candidates must be knowledgeable in COBOL, FORTRAN, SORT, SAS, JCL, IMS/DLI, VSAM, TSO, IBM utilities and program DUMPS.

We offer excellent salaries and liberal vacation benefits. For consideration, please submit your resume to **SCECO Representative at:**

tmsi

Technical Management Service, Inc.

3250 Wilshire Blvd.
Suite S-327
Los Angeles, CA 90010

WE NEED YOU.

We need professionals to work in our MICS, PAS and TSO/MON product lines who are knowledgeable in state-of-the-art IBM technology with experience and expertise in:

- MVS/XA or TSO
- VTAM or SNA
- IMS, CICS, or DBII
- SMP and INFO/SYS
- ISPF

We need you, if you also have a solid background in MVS installation management in any of these areas:

- Product Development
- Customer Service
- Systems Modeling
- Capacity Planning
- Computer Education
- Network Management and Performance
- SMF and RMF Data Analysis
- Product Documentation
- Problem/Change Management

Our atmosphere is casual, but intensely productive. Our salary, benefits, and relocation package is one of the best in the industry. Our commitment is to excellence — in software products, user support, education and staff.

If you are interested in a fast-paced, technically challenging, business driven firm, that is among the top 50 U.S. supplier's of software products and services as ranked by the ICP Software Business Review, call or send credentials to:

Marianne Brown

MORINO ASSOCIATES, INC.
8615 Westwood Center Dr.
Vienna, VA 22180-2219
(703) 448-8868

An Equal Opportunity Employer

Programmer/Analyst

Put your problem solving skills to work for a leader in information technology.

Harris, a Fortune 200 corporation with sales of $2 billion, is a fast-growing company in advanced communication and information processing. We have an immediate requirement at our corporate headquarters for a Programmer/Analyst. This individual should be highly motivated and possess excellent problem solving skills.

In this key position, you will design, program and implement applications using high level languages (SAS, FOCUS and IFPS) on both the Harris 800 and the IBM3081. You will also be responsible for the maintenance and modification of existing COBOL applications.

To qualify, you should have a Bachelor's degree, preferably in Computer Science with a minor in Accounting or Business. 2-3 years' relevant experience in finance applications, and experience with IBM PC/microcomputers would be a plus. Experience with FOCUS and/or IFPS is a must.

Harris offers a competitive salary and benefits program. Please forward your resume including salary requirements to: Corporate Staffing, Harris Corporation, Dept. CW, Melbourne, Florida 32919.

We are an equal opportunity employer M/F/H/V

HARRIS

IF IT'S HAPPENING IN ELECTRONICS, IT'S HAPPENING AT HARRIS.

FINANCIAL SYSTEMS ENGINEER

Design, develop, modify, code, and analyze on-line inventory systems for bond trading as well as other financial analysis systems. Writes and modifies computer programs for new and existing computer systems. Analyze, develop, and implement telecommunication needs of five branch offices. Develop in-house software or evaluate existing software for purchase to connect such offices. Develop and design financial information system as needed for future use by company.

Requires B.S. or B.A. degree in Business Administration with major in Finance. Also requires two years actual job experience or two years experience as Information Systems Engineer. Must be able to program in Applesoft Basic on Apple II computer, program in Basic-2 on Wang 2200 computer and design financial systems applications. Hours: 8:30 a.m. - 5:00 p.m. 40 hours per week at $24,000.00 per year salary.

PLEASE SEND RESUME TO:

Ms. Nancy Thompson
Minnesota Department
of Economic Security
390 Second Avenue South
Minneapolis, Minnesota 55401

Control Number: 4-84
EMPLOYER PAID AD

ANNOUNCEMENT OF POSITION VACANCY

Ball State University
Muncie, Indiana
Director, Center for Information
and Communication Science

Ball State University invites applications and nominations for the position of Director, Center for Information and Communication Science available July 1, 1985. The Director reports directly to the Provost and Vice President for Academic Affairs and directs all aspects of the operation of the Center for Information and Communication Sciences, including the academic programs, research and service activities, production, and faculty development connected to the Center.

Qualifications: baccalaureate degree from an accredited institution, a combination of post-baccalaureate education, media experience, knowledge of computer applications and of information and communication science technology; connections with external funding sources; demonstrated abilities to communicate; higher education experience; and administrative experience that will enable the individual to provide leadership and vision for the diverse activities of the Center.

Applications, current Vita and the names, addresses, and telephone numbers of at least three references should be addressed to: Center Director Search, Office of the Provost, AD-105, Ball State University, Muncie, IN 47306, phone (317)285-1333. The position is open until filled; however, review of credentials will begin on December 15, 1984.

Ball State University Practices Equal Opportunity in Education and Employment.

MVS

SYSTEMS PROGRAMMER

UP TO $46K

Become an integral member of our new IBM 4381 MVS/XA/CICS technical support team. 1985 represents a quarter of a century of continued expansion in sales, profits and most important: PEOPLE. We are a Fortune 500 Company in a desirable low cost of living metropolitan Sunbelt location. We offer a full range of benefits, training, and career growth. You probably won't qualify for our top salary to start, but you'll have the opportunity to earn it. Apply in confidence with your resume and salary history (and forget having to pay state income tax).

Reply to CW-84097, Computerworld, Box 880, Framingham, MA 01701

PROGRAMMER/ANALYST

Immediate opening for energetic programmer to assist in designing and implementing models and systems for logistics applications in the US Air Force. Minimum 3 years mainframe experience. Mini/Micro experience desirable. U.S. citizenship required. Salary $28K-$32K, depending on experience.

Good working environment and friendly co-workers. This position involves interesting applications for high level public policy decisions, quick response and short deadlines. Be prepared to offer proof of your skills and ability.

NO Phone Calls, please.

Send resume to:

Anne [illegible]
SYNERGY, INC.
1834 [illegible] Street, NW
Washington, DC [illegible]

Director of Computer Services

$3371 to $4098 per month ($40,452 to $49,176 annual salary). Bachelor's plus at least 4 years recent experience with information processing at the supervisory or management level. Experience with H/P 3000 desirable. Closing date to file DISTRICT application is January 4, 1985.

Pasadena Area
Community College
1570 East Colorado Boulevard
Pasadena, CA 91106
(818)578-7388

SENIOR PROGRAMMER

Discover what Alamco and West Virginia can offer you!

Nestled in the beautiful hills of West Virginia is a career opportunity for you.

Alamco, a full service gas and oil producer, is looking for a Senior Programmer with information systems management experience. You'll be joining a progressive company dedicated to technical sophistication and growth.

You need at least five years' experience, skills in COBOL, FORTRAN, BASIC and in-depth experience on IBM hardware and Systems 34/38. Knowledge in both RPGII and III is preferred. Oil and gas industry experience is a plus.

Come join us in Wild, Wonderful West Virginia, and discover a perfect environment for both your career and lifestyle.

We offer an excellent salary and benefits package including profit sharing. Relocation assistance is provided. Qualified candidates send your resume and salary history or call: Personnel Dept., ALAMCO, INC., P.O. Box 1740, Clarksburg, West Virginia 26301, 304-623-6671.

Alamco

Sales

MANUFACTURING AUTOMATION SALES

An experienced, self-motivated sales person is currently needed at our corporate office in Ann Arbor to sell computer-related project management services to the S. E. Michigan industrial automation market. Sales responsibilities will include client identification and development, proposal definitions, development of sales presentation, client negotiations, and on-going client follow up during work execution.

Software Services Corporation has been delivering project management and consultant services to the computer industry since 1976. Our annual growth rate of over 50 percent in the past three years has been the direct result of successful work and satisfied clients.

Qualified applicants for this position will have the following general profile: • Five to ten years of computer sales experience. • Knowledge of the manufacturing automation industry in S. E. Michigan. • Familiarity or experience in the application of computers and systems to such manufacturing applications as production scheduling, inventory planning and control, shop floor control, machining and tooling, robotics, flexible manufacturing systems, CAD/CAM, and/or interplant communications networking. • Ability to develop and present highly professional sales support material such as brochures and trade show material. • Proven ability to develop and close business to meet established sales quotas.

The successful applicant will be offered an outstanding compensation plan, competitive fringe benefits, and the opportunity to perform a significant role in our corporate growth plan.

To apply, please send a copy of your resume to Mr. O. Lundin at the address below. All replies will be kept confidential.

SOFTWARE SERVICES CORPORATION
1290 Eisenhower Place, Ann Arbor, MI 48104
Call collect (313) 971-2300
An Equal Opportunity Employer

Attention UNIX employers

If you have a UNIX-related position to fill, advertise it in the **Computerworld Focus** issue on UNIX. More than 126,000 Computerworld subscribers will receive this supplemental issue.

And research shows that Computerworld's supplemental issues are passed along to the people who are most involved in the topic under discussion.

Call Al DeMille today to reserve space for your ads. You can reach him at (617) 879-0700.

Computerworld Focus/UNIX

Issue Date: January 16
Closing date: December 7
Special show distribution: UniForm

COMPUTERWORLD FOCUS

UNIX is a trademark of AT & T Bell Laboratories

Whether it's discovering ways to squeeze the most oil from shale deposits or creating information systems to streamline business operations, Southern California Gas Company is seeking better ways to optimize the use of energy it distributes to more than 13 million people.

We're currently looking for someone to provide computer programming support to develop and maintain computer systems which produce gas balances, cost of gas forecasts, and revenue forecasts used in the preparation of rate cases, financial plans, and cash flow forecasts.

If you have a degree in Information Systems, Mathematics, or Engineering with an emphasis in programming and/or a degree in Business Administration or Economics with special focus on Statistics, and you have 2-3 years of related work experience, you're the candidate we seek.

Fluency in COBOL is essential and FORTRAN is a plus. Experience with Forecasting/modeling, IBM Hardware and TSO/CICS is also an asset.

This position requires good communication skills, including the ability to communicate technical information in writing to non-technical users. U.S. Citizenship or permanent resident visa required.

Please submit your resume and salary history in confidence to:

Susan Williams-Guerra,
ML 303H

SOUTHERN CALIFORNIA
GAS COMPANY

P.O. Box 3249, Terminal Annex
Los Angeles, CA 90051

Equal Opportunity Employer M/F

COMMUNICATIONS ANALYST

Valmont Industries, Inc., the world's leading manufacturer of center pivot irrigation equipment, also produces and markets lighting standards, transmission structures, tubing, financial services, insurance and a newly-formed computer services business. Our 1983 sales were 194 million. Our company is growing with opportunities for results-oriented professionals.

Reporting to the Vice President-Management Services, this position has accountability for the planning and support activities of voice and data communications for the company and off-site subsidiaries. This involves selection of communications hardware/software, data communications services, modems, network management facilities, and PBX equipment. Will play a key role in preparation of an integrated voice/data office support system for the Company.

We offer competitive salary and benefits, "including relocation to an area offering a variety of lifestyles - city, suburban, rural and lake-side", modern facilities, plus an opportunity to make an independent contribution in a growing organization.

If you have had at least 3 years practical experience in voice and data communications, demonstrate a strong knowledge of communications hardware and software, plus enjoy the challenge of a changing, dynamic environment, we want to hear from you. Please respond by December 10, 1984 to: V. Brown, Refer to Job PLC-395 vbCW.

VALMONT
INDUSTRIES, INC.
Highway 275 Valley, NE 68064
Just 15 Miles West of Omaha

An Equal Opportunity/Affirmative Action Employer

VALMONT

EMPLOYMENT SERVICE FOR PROGRAMMERS AND ANALYSTS

National Openings With Client Companies
and Through Affiliated Agencies

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees. We guide, you decide.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 211, Dublin Hall
1777 Walton Rd. Blue Bell, PA 19422
(215) 629-0595

From outside New Jersey, call toll-free 800-222-0153

RSVP SERVICES
Employment Agents for Computer Professionals

WITH PLENTY OF SOUTHERN EXPOSURE.

We're The Federal Reserve Bank of Atlanta, provider of wholesale banking services and support for advanced economic research and analysis. Our home city of Atlanta is one of the nation's most beautiful cities, which boasts a wonderful combination of a modern and picturesque environment. We'll be in Chicago for three days to meet you and discuss the following exciting career opportunities for computer professionals in Atlanta.

• IMS DB/DC APPLICATIONS PROGRAMMERS/SENIOR PROGRAMMERS

These positions require 1-3 years experience in COBOL programming in an MVS environment using IMS DB/DC, including MFS and BTS (on-line, i.e., DC programming required). In addition, exposure to JCL, PANVALET, TSO/ISPF and Dialogue Manager would be an asset, and knowledge of Assembler and IBM PC programming is a plus.

• IMS DB/DC APPLICATIONS PROGRAMMER/ANALYSTS

These positions require 3-5 years experience in an MVS environment conducting automated systems studies for user departments, designing systems, and providing space for development. Strong experience in IMS DB/DC programming (COBOL) is necessary (on-line, i.e., DC programming required). In addition, qualified candidates will have had exposure to MFS, BTS, JCL, PANVALET, and TSO/ISPF. Knowledge of Assembler and IBM PC programming is a plus.

If you're a computer professional who qualifies for one of these unique and exciting career opportunities, and are interested in working in a sophisticated city with a real down-home feeling, THE FEDEAL RESERVE BANK OF ATLANTA is prepared to offer the individuals we select an excellent starting salary commensurate with experience, a superb benefits package and most of all, the outlook of a brilliant future with a great institution in a warm and healthy environment.

Qualified applicants, please call ROBERT BLAIN, DP Recruiter, COLLECT, at 404-521-8774 to set up an interview appointment. We will provide transportation to CHICAGO for qualified applicants.

THE FEDERAL RESERVE BANK OF ATLANTA
P.O. BOX 1731
ATLANTA, GA 30301-1731

AN EQUAL OPPORTUNITY EMPLOYER M/F/H/V

Personal computer users:

FOR FREE ACCESS TO A BETTER JOB CALL CLEO.

EASTERN U.S.: (201) 680-5999
(301) 982-0224
WESTERN U.S.: (213) 618-0000
(408) 294-2000 (415) 482-1580
(619) 224-0000 (714) 476-0000
(818) 991-0900
300 BAUD, Full Duplex,
ASCII code
For 1200 BAUD #'s and access
assistance: (213) 618-1525
Advertisers call (800) 621-9047.
In California, call
(800) 328-2263.

CLEO

National People Shortage

The Blue Cross and Blue Shield Association, the national coordinating agency for Blue Cross and Blue Shield Plans nationwide, is seeking a qualified professional for the following position:

SENIOR CONSULTANT

Medicare Computer Systems

The Senior Consultant will assess Medicare claims processing systems and related activities and identify opportunities for improved operating performance.

Accountabilities of the Senior Consultant position include:

- On-site reviews to analyze the performance and operational characteristics of claims processing systems
- Project management
- Technical assistance to our member Plans involving the implementation of HCPCS, EOMBs, transfer of A and B data, etc.
- Design and development of short and long term systems requirements
- Conducting special reviews and programs to facilitate and communicate new initiatives for Medicare B

Qualified candidates should have a Bachelor's degree in Business Administration or Computer Science and at least 5 years experience in a health care environment. A computer systems orientation is necessary and experience with Medicare claims processing systems highly desirable. Excellent verbal, written and interpersonal skills are essential.

We offer a competitive salary and benefits package. For consideration, please send resume with salary requirements to: Colleen Nebendahl, Division Personnel Consultant, 676 N. St. Clair, Chicago, IL 60611. We are an equal opportunity employer m/f.

Blue Cross
and
Blue Shield
Association

Developing the world's most advanced systems software requires exceptional talent.

For 25 years, Applied Data Research has been the "driving force" in software development. Many of the innovations we introduced years ago are now considered industry standards. Many of the software systems we are developing today will no doubt become the standards of tomorrow.

Currently, ADR software development professionals in Princeton, NJ and Dallas, TX are taking an innovative look at 4th generation systems software for IBM mainframe and personal/micro computer technologies. Individuals interested in associating themselves with this "world-class" development effort should be experienced in any of the following areas:

SYSTEMS SOFTWARE DEVELOPMENT

-4th Generation Languages
-Data-Base Management Systems
-Word Processing/Electronic Mail
-Performance Measurement/Capacity Planning
-PC/Mainframe Communications
-Operating System Extensions

TECHNICAL SUPPORT SERVICES

-Data Base Administrators and Consultants
-MVS/DOS/VM Technical Support
-Systems Programmers (MVS/VTAM/NCP)
-Systems Analysts/Programmers (DB/DC)
-Human Factors

Applied Data Research offers an excellent program for professional development, relocation assistance, and a compensation package which is fully commensurate with your education, experience and potential. For immediate consideration forward your resume or call Mr. Gary Johnson, (201) 874-9000, APPLIED DATA RESEARCH, INC., Route 206 & Orchard Road, CN-8, Princeton, NJ 08540.

APPLIED
DATA
RESEARCH

An equal opportunity employer

NEW ORLEANS

Spicy! That's the flavor of New Orleans. New Orleans provides its residents an enviable lifestyle. Great restaurants, a warm climate, and world renowned celebrations, such as Mardi Gras and the New Orleans Jazz and Heritage Festival, have kept New Orleans the Queen city of the south.

But New Orleans is much more than a great place to live, it's a great place to further your Data Processing career. New Orleans is the home of MIDDLE SOUTH SERVICES, INC., the service arm of the Middle South Utility System.

MIDDLE SOUTH SERVICES is currently involved in several projects including large scale IMS DB/DC systems development. The current hardware environment consists of IBM 3084, 3081, MVS/XA, 4381 VM, and Tandem.

Openings currently exist in the following groups:

- **COMMERCIAL/SCIENTIFIC APPLICATIONS DEVELOPMENT**
- **TECHNICAL SUPPORT**
- **DATA ADMINISTRATION**
- **STANDARDS ADMINISTRATION**

Middle South offers an exceptional
Relocation Package including:
Relocation Allowance (One Month's Salary)
Paid Moving Expenses
Paid House Hunting Trip
Mortgage Interest Differential
plus Interim Living

We offer an excellent benefits Program and Compensation Package. For more information contact Joe Hotard, Byron Heath or Gary Silbert:

1-800-231-4481
or send resume to:
MIDDLE SOUTH SERVICES, INC.
P.O. Box 61000, NEW ORLEANS, LA 70161

MIDDLE SOUTH
SERVICES INC.
An Equal Opportunity Employer M/F

COMPUTER PERFORMANCE EVALUATION

Multiple openings from California to New Jersey for qualified MVS performance analysts and capacity planners. Minimum 1 year experience required. Desirable skills include knowledge of MVS, performance tools such as RMF, OCM, MICS, BEST-1, TSOMON. Call or send resume to: Marilyn Kanes, a nationally known CPE professional.

SSI
SCIENTIFIC
SEARCH, INC.
Plaza Office Center, Suite [illegible]
Rt. 73 & Fellowship Rd.
Mt. Laurel, NJ 08054
[illegible]

Data Processing

Software Systems Analyst II

$2,258-$2,745 per month*
*SALARY NEGOTIATATIONS IN PROGRESS

Plans, installs and maintains data communications networks, systems control programs, and/or data base software. Requires COBOL and systems programming experience. Assembler language desirable. Experience required in an IBM 370, 303X, 308X, OS/VS or VM environment.

Submit application materials by 5:00pm., Monday, December 3, 1984 to:

Employment Information Desk
4100 Normal Street
San Diego, CA [illegible]
[illegible]

SAN DIEGO CITY SCHOOLS
equal opportunity employer F/M/V/H

Data Processing

Management Opportunity

High tech, high growth company offers unique management opportunity for experienced marketing consultant with solid working knowledge of accounting and international markets. This position requires understanding of marketing and statutory requirements for application software in major international markets with particular reference to Europe, Asia - Pacific, Middle East, and South Africa. Must have at least five to six years management experience, good communication skills, minimum education required - four year degree in related field, Accounting, Finance, Marketing, etc. Salary commensurate with ability, excellent company benefits. Send resume and salary requirements to:

CW-84088, Computerworld,
Box 880, Framingham, MA 01701
EOE M/F/H/V

FREE RESUME SERVICE

Even though we are a recruiting firm, we do offer a free resume service. Write or call for a resume preparation form. Complete the form and mail to us and we will return a completed resume to you. This is a confidential service with no obligation.

Call 919-378-1261
Adkins and Associates, Limited
P.O. Box 16062
Greensboro, NC 27406

SOFTWARE ENGINEER III

Develop, design and provide technical support for microprocessor based, fault-tolerant integrated information system on VAX 11/780 and in-house designed and manufactured Power 5 Series hardware using knowledge of computer science and electrical engineering. Knowledge or experience in digital technology and microprocessor design required. MS in computer science plus 1 year experience as software engineer required. 40 hr/wk, $26,500 PA. Resume to Computer Consoles Inc., Human Resources Dept.- V-2, 97 Humboldt Street, Rochester, NY 14609.

WALL STREET RESEARCH - COMPUTERS

Assistant to Technology Research Group Head at top ranked Wall Street brokerage firm. Help with financial analysis (spreadsheets), product comparisons (micro computer) and written reports. Requires high energy levels facility with numbers, technical background, good communications skills. Competitive salary and unlimited career potential. Send resume to: Robert Cornell, Paine Webber Inc., 140 Broadway, New York, NY 10005 or call: (212)437-7326.

IMS SOFTWARE DEVELOPMENT PROFESSIONALS

San Francisco Bay Area

AFS/SunData, a leading software supplier to the financial services industry since 1969, is seeking highly skilled IMS professionals to participate in the development of a new online Mutual Funds Software System.

All positions require a minimum 2 years hands-on IMS development experience; Mutual Funds knowledge a plus. We have exceptional growth opportunities for:

- Sr. System Analysts — IMS DB/DC with structured analysis and design experience.
- IMS DB/DC Programmer/Analysts — with COBOL and/or PL-1.
- Sr. Programmer/Analysts — CICS/COBOL.

AFS/SunData offers a comprehensive compensation and benefits package including project incentives, and excellent career growth.

Send resume with salary requirement to S.B. Eanes, Director, Human Resources, AFS/SunData, 951 Mariners Island Blvd, San Mateo, CA 94404. An equal opportunity employer.

AFS·SUNDATA℠

COMPUTERWORLD

The Recruitment Connection...

... the best connection to have when you are looking for quality computer professionals. There is a good reason why COMPUTERWORLD is the number 1 computer industry trade newspaper. No other newspaper of its kind can give you the broad exposure that you will get by advertising in COMPUTERWORLD. It is read by over half a million people, most of them top-notch professionals with top-notch computer companies.

COMPUTERWORLD publishes every Monday and the deadline for receiving your advertisement is always ten days prior to the issue date desired. The open line rate is $9.15 per line with a minimum size of 2 column inches. Send in either camera-ready material or cleanly typed copy with a layout if desired. We also have a telecopier service and adtakers who will gladly take copy over the phone.

Our mailing address is **COMPUTERWORLD, Classified Advertising, 375 Cochituate Road, Box 880, Framingham, MA 01701.** Or call for more information at 1-800-343-6474 or, in Massachusetts, (617)879-0700.

COMPUTERWORLD
The best connection to have.
The only connection you'll need.

OPERATIONS PROFESSIONALS

We are an international data processing software, research, development and consulting firm with 72 branches worldwide

NOW

A new division, OPERATIONS SERVICES, is dedicated to providing professional consulting services to all areas of the computer center. We are looking for more of the finest, most dedicated and imaginative operations people that can be found.

-SR. OPERATORS -OPERATIONS ANALYST
-JCL SPECIALIST -SYSTEMS PROGRAMMERS
-NETWORK CONTROL
•DOS/VSE •MVS •VM •CICS •IMS
IBM/HONEYWELL/BURROUGHS

Travel, people contact, job variety combined with an attractive compensation and benefit package make this opportunity even more attractive. Respond immediately with resume and salary history in confidence to:

CAP GEMINI DASD
OPERATIONS SERVICES
[illegible] W. Kennedy Blvd., Suite [illegible]
Tampa, Florida [illegible]
equal opportunity employer m f

SYSTEMS PROGRAMMER

— Cyber 205 —

The Standard Oil Company (Ohio), a Fortune 25 energy company, is offering the following immediate opportunity in our Cleveland Data Center.

You would be joining our Scientific Data Center which is at the leading edge of scientific computing technology today. The center contains two CDC Cyber 170 computers, a 175 and a 760 running the NOS 2.1 operating system, and a CDC Cyber 205 vector processor running VSOS 2.1.5. All three computers are connected by LCN. Responsibilities include tailoring, installing and maintaining operating systems and serving as a consultant in systems and scientific user areas, interacting with management and technical personnel. Position requirements include a BS in Computer Science, 1 year systems programming experience on the Cyber 205, knowledge of the IMPL language and good communication skills.

In addition to an attractive compensation and benefits plan, SOHIO's **comprehensive relocation package for new hires includes all normal moving expenses. Homeowners also qualify for mortgage interest differential allowance, third party home purchase and other features typically restricted to internal transfers.**

For immediate consideration, in complete confidence, send your resume outlining your background and recent salary history to:

Ms. Jean Hellich, Senior Executive Recruiter
THE STANDARD OIL COMPANY (Ohio)
1424 Midland Building – 702CW • Cleveland, Ohio 44115
An Equal Opportunity Employer
NO THIRD PARTY INQUIRIES, PLEASE.

"Help us Help to Assure America's Energy Future"

SOHIO

DATA PROCESSING PROFESSIONALS CAREER OPPORTUNITIES

Looking to expand or enhance your career as a data processing professional? If so, Decision Consultants, Inc. (DCI) may be the firm you've been looking for. DCI has been providing professional software services for over 11 years. Our consultants are highly respected and continually in demand. Our enviable growth record and low turnover are a testament to the concern we maintain for each of our consultants. In addition, we offer an exceptional company paid benefit package including three weeks vacation, eight paid holidays, major medical, life, dental, prescription, tuition reimbursement and 401K salary savings plan.

We offer four geographic locations: Detroit, MI - Lansing, MI - Chicago, IL - Dallas, TX. Some of our immediate openings include programmers and analysts with two or more years experience in any of the following:

- IMS DB/DC
- IBM-PC
- MULTICS
- ORACLE
- FOCUS/RAMIS
- PROCESS CONTROL
- IDS & DMIV
- HONEYWELL
- UNIX
- TANDEM
- CAD/CAM
- "C"
- IMAGE
- HP3000
- CICS
- DEC/VAX/PDP
- HOGAN

Call or send resume to C.W. Whitaker
24001 Northwestern Highway, Suite 602
Southfield, MI 48075
313/[illegible]

IMMEDIATE OPPORTUNITIES

IMMEDIATE OPPORTUNITIES CURRENTLY exist for skilled DP professionals with the following skills.

SYSTEM 36 - Requires RPG II experience. Salaries $18-41K.

SYSTEMS PROGRAMMERS - MVS, VM, and DOS opportunities. Salaries $[illegible]-54K.

DATABASE SPECIALISTS - IDMS, IMS, ADABAS, MODEL 204 and DMS 1100 designers, programmers and DBA's needed. Salaries $[illegible]-55K.

UNIX/C - Software engineers and systems programmers. Salaries $27-45K.

IBM PROGRAMMER ANALYSTS - COBOL and/or ALC opportunities for programmers and project leaders. Salaries $[illegible]-37K.

Positions are available in Northeast, Sunbelt and West locations.

For more information call Tom Arnold collect at (301) [illegible] or send resume to:

J. Randall Associates
P.O. Box 1661
Rockville, MD 20850
Attn: Tom Arnold

Average Temp - 72°
SUNSHINE STATE

Florida's DP community is Booming!
Our clients need your expertise

ANALYSTS/PROGRAMMERS

PL1 w/IMS or CICS	To $38K
"C" on DEC VAX, Harris, etc.	To $40K
MVS Cobol w/IMS DB/DC	To $38K
Deposits, Loans, CPCS, Cobol	To $37K
Fortran, PL1, IBM 308X	To $35K
8086, PC Internals	To $40K
MSA GL, MVS Cobol	To $30K

SOFTWARE/INTERNALS

MVS, CICS, IMS Sys Prog	To $48K
ACF/VTAM, NCP	To $38K
Telecom Eng-Comten, 37XX	To $38K
DEC VAX, Harris Sys Prog	To $37K

Call For Others

AVAILABILITY, INC.
813/872-[illegible]
Dept. C, P.O. Box 26434
Tampa, Florida 33622

[illegible] National Registry of UNIX* job openings & professionals

P.O. Box 19[illegible], Dept. CWU
Houston, TX 77224
Please send resume.

Scientific Placement, Inc.
[illegible]

DATA PROCESSING

JOBS-JOBS-JOBS
ATTN: SYS 34-36-38
– $[illegible]-$45,000 –

Attn: Sys 34, 36, 38 Progs, Analysts, Mgrs. Immediate openings for high $'s. Please call for details & take the first step towards an exciting new career! All Fee Paid.

[illegible]
522 Fifth Avenue
New York, N.Y. 10036
212-221-[illegible] (agency)

What do you get when you combine Georgia hospitality with TRW technology?

The state-of-the-art in a more relaxed state of mind.

The brand new TRW Defense Systems Group Warner Robins Engineering facility at the heart of the peachtree state of Georgia is one of the most sophisticated research and development centers to be found anywhere north, south, east or west. But it's the southern hospitality you'll find in Warner Robins' friendly community that makes it so ideal for you and your family. For instance, you'll still find affordable housing, good schools, and a variety of recreation programs available. Sparkling beaches and majestic mountains are within easy reach of any weekend. And, if that's not enough to delight you, TRW's leading edge challenges surely will.

ELECTRONIC WARFARE/AVIONICS SYSTEMS

We're at the forefront of the research, design and development of embedded computer systems for airborne applications and associated ground based support systems. Deeply involved with advanced hardware and software systems engineering for airborne radar, ECM, ECCM, radar warning-receivers, and avionic test and support systems. Our ultra-modern facilities offer individual offices with your own computer work station.

Consider your opportunities in any of the following areas:

EW SYSTEMS

Positions require a BSEE or equivalent and experience in one of the following: threat analysis, design analysis and test, ECM Technique Measurement, System Design, RWR and ECM systems, Hardware/Software integration, requirements development/analysis.

MODELING AND SIMULATION

Positions require a BSEE or equivalent and FORTRAN development experience in one of the following: radar simulation, EW system simulation, ECM system simulation, RWR system simulation.

REAL TIME SOFTWARE DEVEOPMENT

Positions require a BS in EE, Physics, Math or C.S. and Assembly/JOVIAL/FORTRAN experience in one of the following: executive structure, hardware/software interface, signal processing, algorithm development, diagnostics fault isolation.

SOFTWARE DEVELOPMENT

Positions require a BS in EE, Math or C.S. ahd experience in one of the following: information management systems, data reduction and analysis, processor simulations/emulations.

SOFTWARE TEST

Positions require a BS in EE, Physics, Math or C.S. and experience in one of the following: performance analysis, software V&V, hardware/software interface, real time software.

TRW offers excellent salaries and an outstanding flexible benefits plan which includes vision and dental care. Relocation assistance is available. For immediate consideration, call COLLECT or send your resume in confidence to:

Carl [illegible] or Mel [illegible]
912-[illegible]-7300
TRW Defense Systems Group
200 Highway 247 South
Warner Robins, GA 31093

Equal Opportunity Employer
U.S. Citizenship Required

TRW

OPERATIONS - RESEARCH ANALYST - JOB ORDER NO. 41[illegible]. 40 hours per week, $22,000 per year. Perform analysis of current business procedure and operational problems, refine and convert data to programmable form for statistical modeling and computer simulation studies; conduct hypothesis testing to insure adequacy of data and operational model; work with EDP staff to design and develop accounting and financial application software based on operations research. M.B.A. with course work in managerial accounting, finance and quantitative methods. Must also possess one year in job offered or one year of experience in computer programming/application of quantitative methodologies, demonstrated ability in use of statistical modeling and computer simulation for development of accounting and financial application software; thorough working knowledge of micro computer system and BASIC, FORTRAN and COBOL languages. CONTACT LA OFFICE OF EMPLOYMENT SECURITY, 1[illegible] Auburn Avenue, Monroe, Louisiana 71207

Programmer/Analyst

Programmer/Analyst needed to design, analyze and install revenue accounting and financial accounting systems. Prepare flowcharts for accounting systems. Code, test and implement accounting systems utilizing VM/CMS, CICS (Command Level), VSAM and COBOL. Coordinate utilization and implementation of accounting systems with user management. Requires Bachelors in Finance or Business Administration and two years experience in job offered or will consider Masters Degree in Business/Data Processing or its equivalent in lieu of experience. Must have knowledge of accounting programming systems, CICS and COBOL. Forty hour work week. $22,500 per year. Apply at the Texas Employment Commission, Dallas, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. Job order # 3[illegible]. Ad paid by an Equal Employment Opportunity Employer

POSITION ANNOUNCEMENTS

HAVE YOU EVALUATED YOUR CAREER LATELY?

Are you looking for more challenge... greater recognition opportunity... a leading edge systems environment... competitive compensation?

Bank of Boston, New England's innovative leader in the financial community, is looking for you. We are seeking top flight, top 10% achievers in:

- Systems Development
  Where a structured programming and analysis and project management approach is the foundation for Programmer/Analyst and Systems/Analyst careers in Banking, Accounting, and Treasury applications development and maintenance working with IBM 3081, 3033, MVS, TSO/SPF, IDMS with ADS-O, FOCUS, DEC VAX, COBOL, PL/1, Assembler.
- Project Management
  Where your experience in an IBM, MVS mainframe environment including PCs, Decision Support Systems and Banking applications development can qualify you for a Project Manager or Senior Trouble Shooting role in Retail Banking or Treasury systems.
- Strategic Planning
  Where TSO, LOTUS 1-2-3, SAS, STRATEGEM, Megacalc and multi-language skills are used to develop and maintain corporate strategic modeling, forecasting and Asset/Liability Management Systems.

Bank of Boston offers the comprehensive benefits program you deserve. Join us now while we develop major new projects in an expanding industry—changes that require the best minds in EDP. If you are that top 10% individual, and you seek real challenge and career flexibility, write to Thomas Matera, Bank of Boston, P.O. Box 1976-ER, Boston, MA 02105.

Go Direct. You can access Bank of Boston's on-line Career Network through your own PC or terminal. Dial 617-275-4112, press Return, key in the password "BKBOS" and press Return again. Your call is completely confidential.

BANK OF BOSTON

An Equal Opportunity Employer

©1984 The First National Bank of Boston

Dunhill

Means Experienced Systems Programmers, Analysts & Programmers

At Dunhill of Charlotte our only business is finding the right people for the job. We represent many of the largest and most respected corporations across the country. That's why we can offer the busy data processing professional the opportunity to explore the job market without doing any more than simply sending us a resume.

We are not asking you to make any commitment. There is never a fee with Dunhill of Charlotte, and all matters are held in strict confidence. What more could you ask for? We will also keep you up to date on industry trends and current salary ranges in the DP area.

Keep your career running in high-gear by letting Dunhill of Charlotte find the opportunity you have been searching for as a professional. We want to go to work for you today! We specialize in the placement of experienced Programmers, Analysts and Systems Programmers in the Carolinas and throughout the beautiful Southeast and Southwest. Give us a call now, or send your resume to:

Keith Reichle, CPC
Data Processing Consultant
6401 CARMEL ROAD
SUITE 107
CHARLOTTE, NC 28226
1-800-438-3812
In North Carolina call collect (704) 542-0312

Dunhill
Of Charlotte, Inc.

An Equal Opportunity Employer M/F

NORTHWESTERN COLLEGE has a tenure-track faculty opening in Computer Science for the Fall of 1985. Teaching assignments in both beginning and advanced courses, as part of a new Computer Science major. Requirements include a masters degree in Computer Science or a related field, with a doctorate in Computer Science preferred. Submit a letter of application, with curriculum vitae, to Dr. Harold Heie, Vice President for Academic Affairs, Northwestern College, Orange City, IA 51041. Northwestern is an undergraduate Christian liberal arts college affiliated with the Reformed Church in America. An Equal Opportunity Employer.

SUPERVISOR OF APPLICATION SYSTEMS AND PROGRAMMING

A large Sacramento suburban school district serving 46,000 students at 75 sites is seeking an individual for the DP dept. to supervise 13 professionals using a Sperry 1100/60 computer system in upgrading services by designing and implementing "state of the art" software and hardware. Requires 5+ yrs exp. in systems analysis and application programming. Salary to $3068/mo. Apply by 12/12/84 AA/EOE

San Juan Unified School District
Personnel Services Dept.
3738 Walnut Avenue
Carmichael, CA 95608
(916)484-2424

DATA PROCESSING MANAGER

Mid-Atlantic hospital has an immediate opening for a DP Manager. Experience with IBM System 38 and dynamic controls H.P.M.S. desired. Salary commensurate with experience. Apply in confidence to:

Dept. 11-55, Box 1100
Columbia, MD 21044

an equal opportunity employer

MANUFACTURING TO $35,000

Opportunity abounds in Minnesota for experienced manufacturing analyst with programming and design background. All new development using state-of-the-art tools, including IDMS, ADS/ON-LINE, Fourth Generation Languages and microcomputers. Requires from 3-7 yrs experience in development of manufacturing systems. Salaries range from Mid-$30's Up depending on experience. Job #'s 5726, 5801, 5802. Call Mark David or Tim Smith at (612)[illegible]

ROBERT HALF
of Minneapolis, Inc.
3636 IDS Center
Minneapolis, MN 55402

HOT! HP 3000 HOT!

Numerous openings for lightweight HP3000 programmer/analysts in the 2-4 year range. Locations include:

DURHAM, NC
RESEARCH TRIANGLE PARK, NC
ATLANTA, GA
SAVANNAH, GA
COLUMBUS, GA

Fortune 500 companies with superb benefits and relocation packages. ALL FEE PAID!

CALL DIANE AMOS, CPC
1-919-[illegible]
The "HP PRO"

Personnel Placement, Inc.
P.O. Box 1616
Burlington, NC 27216-1616

DATA PROCESSING PROGRAMMER/MANAGER

Relocate to beautiful Las Vegas. IBM Series I. Publishing and direct mail applications. Minimum 2 years on-the-job experience required. Name your salary based on ability. Excellent benefits. Send resume to: A.G.H. Publishing, 2927 Industrial Road, Las Vegas, NV 89109.

Systems Programmers Network Engineers

European Opportunities

EDS, a world leader in information processing has immediate needs for Technical Personnel in Oslo, Norway for a 2-year assignment.

Systems Programmers
- MVS Systems Programming
- VSAM, CICS, ALC
- IMS, VAX, DP
- 10 years DP experience

Network Engineers
- X.25 start-up experience
- SNA experience a plus

EDS offers competitive salaries and an excellent company-paid benefits package which is considered one of the best in the industry. For more information, please contact:

Lyndel Hurley
Electronic Data Systems
5400 Amberton Parkway
Dept. 1CW2044
Dallas, TX 75240
(214) 982-6000

EDS

Electronic Data Systems Corporation

An Equal Opportunity Employer

MEMPHIS

Welcomes you. We specialize in the placement of data processing professionals and have done so for nearly 20 years. If you qualify for a position commanding a salary range over $25,000, please contact us. Each applicant receives the utmost of confidentiality. Our clients pay our fees and provide relocation assistance.

ROMAC.
One Commerce Sq., Ste. 2000
Memphis, TN 38103
901-[illegible]

Programmer Analyst

Programmer Analyst needed to develop, modify, troubleshoot and maintain UNIX operating system and application software. Development of in-house data base applications and communication applications. Requires a Masters Degree in Computer Science or will consider a Bachelors Degree and two years experience in lieu of Masters. Background must include knowledge of UNIX operating system and multi-user database knowledge as well as two of the following programming languages: COBOL, FORTRAN, PASCAL, BASIC, ASSEMBLY. Forty hour work week. $[illegible] per week. Apply at the Texas Employment Commission, Arlington, Texas or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. Job Order # [illegible]. Ad paid by an Equal Employment Opportunity Employer.

MOVE AHEAD WITH COMPUTERWORLD

More computer people read Computerworld than any other newspaper in the United States; more than half a million computer people every week.

Among our readers at user organizations, about half claim to look at recruitment ads every other week (only a small percentage say they never look at recruitment ads).

No wonder Computerworld carries more recruitment ads for computer people than any other publication. To place your ad or to get a rate card with complete details on Computerworld's Classified Section, call or write:

Classified Advertising
COMPUTERWORLD
375 Cochituate Road
Box 880
Framingham, MA 01701
1-800-343-6474
617-879-0700

RSTS

Established software house needs RSTS expert to assist with major enhancements and expansion of existing product lines. Familiarity with MCBA pkgs and DIBOL a plus. Good salary and location twenty minutes north of Los Angeles. Call or rush resume to

MCBA, 2441 Honolulu Avenue, Montrose, CA 91020, Attn: Personnel Manager; (818) 957-2900

HEALTH CARE INFORMATION SYSTEMS CONSULTANTS AND TECHNICIANS

Entry level to senior consulting positions available with Big Eight accounting firm. Candidates should have an undergraduate degree and at least 2 years of health care industry experience. Graduate degree and extensive experience preferred for senior positions. Located in sunny Tampa, Florida. Involves weekday regional travel. Outstanding opportunities for advancement. Please send resume to:

Health Care Information Systems Group
P.O. Box 748
Tampa, FL 33601

IDMS ADS/O

FLORIDA

Applications programmers. Have 12 Florida positions. Now is the time to act for a Florida move. Mail resume or call collect for interview.

Executive Consultants
1800 Fairfield, Ste. 101
Shreveport, LA 71101
(318) 222-1000

POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS

HONEYWELL PROFESSIONALS

DPS 6, 7, 8
LEVEL 6, 64, 66
MICROSYSTEM 6

L.R. Wechsler, Ltd., a multi-million dollar systems development and consulting firm, has immediate openings for Honeywell-experienced:

PROJECT MANAGERS
TASK LEADERS
SENIOR PROGRAMMERS/ANALYSTS
PROGRAMMERS

We offer:

- Multi-year commitments in the Fortune 1000 commercial and government sectors
- Travel, including Washington, D.C. to the West Coast and New York
- Stable, growing, and state-of-the-art environment

L.R. Wechsler, Ltd. offers a growing benefits package, excellent salaries, and, because of company expansion, consistent upward career mobility. For consideration send your resume to Jo Ann Hazard, Personnel Representative.

L.R. WECHSLER LTD
10379 Democracy Lane
Fairfax, Virginia 22030

EOE M/F/H/V PRINCIPALS ONLY

FOR ACHIEVERS ONLY

INTERMEDIATE to SENIOR LEVELS

- Software Development Mgr.
- Technical MVS Specialist
- Data Base Administration
- Voice/Data Communications
- Office Automation
- Lang C Unix
- Microprocessor Software
- Systems & Programming Mgr.
- EDP Audit/Security
- Systems Planning
- Manufacturing Systems
- PC Micros

BRUCE A. MONTVILLE
Managing Partner

EXETER 2100™
National Recruiting Consultants
(603) [illegible]-6712

COMPUTER PARK, P.O. BOX 4979
HAMPTON, NH 03842

EDUCATION

UNIQUE COURSES:
HANDS-ON TRAINING
with 20 Terminals on our IBM 4341 with VM/CMS/CICS (1.6) DB/DC Software Systems.
Write and test your own programs.
UNLIMITED SUPERVISED LAB TIME
to complete the assignments.

WRITE OR CALL
212-777-5040
ICCS
CORPORATE
TRAINING
CENTER
10 E. 21 ST., NYC 10010
International Computers & Communication Systems, Inc.

Your Strategic Career Choice

Does your career need a strategic boost? If so, you should consider Dartmouth's professional program in the design and management of information systems.

Our two-year Master's program is designed to equip tomorrow's information systems managers to play a leading role in the design and development of effective business solutions to business problems. We offer a blend of technological, management, and communication skills, and a record of career advancement.

Students in Dartmouth's CIS Program spend one term as interns in a variety of sponsoring organizations. On campus, they study the broad fundamentals of information systems, networks and distributed processing, current analysis and design methodologies, database management systems, communication and management skills crucial to effective planning and implementation, and the social, ethical, and organizational issues related to information systems. Case studies and guest lectures by practicing managers of information systems and professionals-in-residence are regularly featured.

If you have previous experience in the computing field but want to be equipped to assume more responsibility and leadership, why don't you consider giving us next year? For more information, write:

Program in Computer & Information Science
Dept. C., Nathan Smith Building
Hanover, NH 03755

Dartmouth College

Researching all your options will show you that your best source is COMPUTERWORLD

BUY - SELL - SWAP

IBM
5110 5120
3741 3742
DATAMASTER

1255 MICR

SYSTEMS
34 36 38 32 23
All Associated Peripherals

BUY SELL LEASE

- Prompt Delivery Nationwide
- Upgrades & Features Available
- Trade Ins
- IBM Maintenance Guaranteed

Call Today for Quotation
(615) 352-5505

SOUTHERN DATA SYSTEMS
Nashville, Tennessee

CLIP AND MAIL

SERIES/1
BUY • SELL • LEASE
NEW OR USED
- 4955-F—IMMED. AVAILABILITY
- 4956-[illegible]—NEW

SEVERAL AVAILABLE TO SHIP 12/15/84

SPECIAL
- 3178—24 AND 36 MO. RATES
- 3278/2—ALL KEYBOARDS

Find out more about ECONOCOM—Clip this ad, attach your business card and mail it to us. We'll send you a copy of our New Capabilities Brochure plus a complimentary copy of our Computer Market Advisor.

3262-B1 $8600
- 5251/12 (SINGLE CLUSTER) $[illegible]
- 5251/12 (DUAL CLUSTER) $[illegible]
- 5256/1 PRINTER $[illegible]

DISPLAYWRITER SPECIAL

• 6580—A02 6580-B02 5218-A01	65% OF LIST
• 6580-A04 6360-011	75% OF LIST

SPECIAL
3420 LEASE RATES ON INTERIM 3480 IMPLEMENTATION—
CALL FOR DETAILS

INVENTORY SALE
- 3420-5
- 3350-A1,2,3
- 3278-2
- 3410-3
- 3880-11
- 3340-A, B
- 3881-075
- 8040—ALL
- 3880-A1
- 3370-A12
- 3370-B12
- 3350-A2
- 3380-B2F
- 3370-A01
- 3370-B01
- 8211-1/2

DECISION DATA
- 6751-1
- 3751-1
- 5751-1
- 6708-25
- 8867-36

SYSTEM/36
- EXCLUSIVE VAR AGENT
- SPECIAL 36 MO. RATES
- ANY SYSTEM WITHIN 30 DAYS

CALL NOW FOR DECEMBER INSTALLATION

WANT TO BUY
- 3803-2
- 3830-2
- 3380's
- 3880's
- 5281-1
- 3375's
- 3420's
- 3881-K
- 3883-J
- 4341
- 8294-2
- 5340-F

ECONOCOM IN MANY INSTANCES, RIGHT IN YOUR OWN BACKYARD

ECONOMIC COMPUTER SALES, INC.
CORPORATE OFFICES
845 CROSSOVER LANE
P.O. BOX 240087
MEMPHIS, TENNESSEE 38124
901-767-6135 OR 800-[illegible]

- LOS ANGELES, CALIFORNIA 714-[illegible]
- ATLANTA, GEORGIA 404-[illegible]
- LOUISVILLE, KENTUCKY 502-[illegible]
- DALLAS, TEXAS [illegible]
- BIRMINGHAM, ALABAMA 205-[illegible]
- LITTLE ROCK, ARKANSAS 501-[illegible]
- BOSTON, MASSACHUSETTS 617-[illegible]
- BOULDER, COLORADO 303-[illegible]

ECONOCOM ADHERES TO THE HIGH STANDARDS OF ETHICAL CONDUCT REQUIRED FOR MEMBERSHIP IN:

CLIP AND MAIL

ECONOCOM is a service mark of Economic Computer Sales, Inc.

MARION

BUY • SELL • MAINTAIN

IBM SYSTEM/34/36

DISPLAY STATIONS

- PROMPT DELIVERY
- ALL SYSTEMS 34 ARE FULLY RECONDITIONED
- ALL SYSTEMS 34/36 CONFIGURED TO YOUR NEEDS
- PERIPHERALS — NEW AND USED
- UPGRADES AND FEATURES DELIVERED AND INSTALLED
- LONG TERM LEASES AT COMPETITIVE PRICES
- SHORT TERM RENTALS
- TRADE-INS ACCEPTED
- GUARANTEED WMC or IBM MAINTENANCE

SYSTEM 36

A PHONE CALL CAN SOLVE ALL YOUR EQUIPMENT PROBLEMS

TALK TO US . . . NEW JERSEY (201) 343-4554
CONNECTICUT (203) 758-2400
PITTSBURGH (412) 884-6612

WILLIAM MARION CO. INC

DEC

RENT • BUY • UPGRADE • SELL

PDP, 11/03, 11/04, 11/23, 11/24, 11/34, 11/44, 11/70, VAX/730, VAX/750, VAX/780

SYSTEMS • OPTIONS • SUPPLIES

VAX 780	2MB, RUA81, TE16, DMF32, VMS,	Short/Long-term Rental
VAX 780	1MB, RUA80-CA, TU80-AA, DMF32, LA120, VMS (NEW)	$78,800
11/70	512KB MOS, RWP06, TWE16, DZ11-E (USED)	$61,000
11/23+	256KB, Dual RL02's, DEV11-C, VT102, License (NEW)	$13,500
11/44	1MB, RJP06, TJE16, DZ11-A (USED)	$41,400
11/34	1MB, H9642, RUA80-AA, TU80, DZ11-A (NEW)	$40,750

Customized Configurations—Call With Your Request.

In Stock
11/24-BC
11/04-DC
1134A-YE
11X44-DA
BA11-KU
DW750
DZ11-F
H9642
LA12-AB
LA120-RA

Specials

11/70 (used)	$19,000
DZ11-DP (used)	$ 1,000
LA120-DA (new)	$ 1,000
RA80-AA (new)	$12,000
RP06-AA (used)	$ 5,000
RP07-AA (used)	$19,000
RUA80-CA (new)	$16,150
TU80-AA (new)	$ 9,000

In Stock
LP11-EA
LP11-VA
MS11-PB
RK611-EA
RM03-AA
RM05-AA
RP06-AA
TS11-CA
TWE16-AA
VT220-AA

CALL FOR OUR FREE CATALOG
DEC is the registered trademark for Digital Equipment Corp.

BROOKVALE
800-645-1167

IBM UNIT RECORD EQUIPMENT

SALE OR LEASE

IBM UNIT RECORD MACHINES
026—029—082—083—084
085—087—088—129—514
519—548—557

NEW & USED
DISK PACKS—DATA MODULES
2316—3336(1)—3336(11)—3348(70)
MAG. TAPE-DISKETTES
Every Item Guaranteed

Highest Prices Paid for Used Packs & Modules

[illegible] CORPORATION

SERIES I SPECIAL

Control Data
126MB Removable Drives . . $12,900
Diskette Drives . . . . $ 1,495
Printers & Displays

New or Used
Immediate Delivery

IBM
4956 Processors
4967 200MB Disk Drives
All Peripheral & Features

ALL UPGRADES
Save Money On Your Present Equipment With Our Purchase/Leaseback Program
DISK 3340 3350 3370 3375 3380
PRINTERS
TAPE 3411 3420
TERMINALS 3277 3278 3287 3296
LEASING SHORT OR LONG TERM NEW OR USED
SYSTEM 38 New or Used
4300 3033 308X New or Used
SERIES I IBM & CDC CPU's ALL MODELS
DISK TAPE PRINTERS FEATURES New or Used
SYSTEM 34/36
BUY SELL LEASE
IBM Maintenance Guaranteed, Equipment Configured to Your Requirements
If IBM MAKES IT, WE CAN...
whether you buy, lease or rent from us.
Call us for a quote.

C.D. SMITH & ASSOCIATES, INC.

DEC computer systems & options
12605 East Freeway, Suite 318
Houston, Texas 77015
(713) 451-3112
TELEX 76-2547

DEC

WE ARE SELLING:
VAX 11/730, 11/750, 11/780
& MOST VAX OPTIONS

ALSO:
730, 750, 780 CPU's
780 w/785 Upgrade Option
725 Systems
RA80, RA81, RA60, TU80
FP730, FP750, FP780-AA
MS730, MS750, MS780 Memories
H7112-A, H7100-A, DW780-AA
H9652-HA, H9652-MF, H9642-FA
RLV22-AK, RL02-AK, DZ11-E, TM78-C

Call, if you want on our Mailing List
(713) 461-3112

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed. Guaranteed for use at 800 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals

We pay freight on orders over 500 tapes. All orders shipped within 48 hours.
Call or Write

Computer Tape Mart
44A Seabro Avenue
N. Amityville, New York 11701
[516] 842-5512

DEC 2060

Processor KLB, 2 Megawords memory
2 RP20 Disk drives
RP06 System disk
8 DH11 16-Line terminal interface
2 DN20 Communications Front End

For Sale or Lease
Delivery Negotiable

Contact: Gerald St. Amand
(317) 263-7158

---

* * * * DEC * * * *

BUY—SELL—LEASE—TRADE—CONSIGN
SYSTEMS — PROCESSORS — OPTIONS
PERIPHERAL — MODULES — MEMORY
— SPARES —

NATIONAL COMPUTER EXCHANGE
(800) 624-9299
600 North Lunar Avenue, Brea, CA 92621
(714) 990-5988

DATA GENERAL SPECIALISTS

FOR
Surplus New & Used Equipment & Systems with full depot repair facilities.
CALL US
WE TAKE THE TIME.
- WE CARE -

JM Associates
Pleasant Valley Ave.
Moorestown, NJ 08057
609-235-5111

FREE DEC and DATA GENERAL Discount Guide

Call or write for your copy TODAY!

NEWMAN
(313) 994-3200

STRATUS

FT 200

Available Immediately

Robert Gold
(212) 344-7405

BUYING?

Whether you're looking for big computers little computers, terminals, printers, software, time sharing or services, you'll find it in Computerworld classifieds.

Pages of ads every week, with everything from Discs to DEC's from time sharing to terminals, and software for every size computer system.

You'll find what you need in Computerworld classifieds.

Call 800-343-6474 (or 617-879-0700) for more information

WE BUY • SELL • LEASE

JOIN THE MANY FORTUNE 500 COMPANIES THAT UTILIZE IBM EQUIPMENT FROM TEXCOM . . . THE IBM SPECIALISTS

4331 4341 • 4361 4381

We buy, sell or lease • 2, 3, 4 year leases

WE'VE GOT IBM PERIPHERALS

3803	3375	3880	3350	3203	3811
3420	3380	3340	3370	3211	3262

IBM S 34 · 36 · 38

All upgrades available now • 1, 2, 3 year leases

We'll take S/34 trade-ins

WE'VE GOT ALL IBM PRINTERS AND TERMINALS

PLUS 3864 MODEMS NOW

SERIES 1

All features and peripherals • Convenient leases

We buy, sell or trade

WE WANT TO BUY

IBM PC's — IBM XT's AND

IBM DISPLAYWRITERS

TexCom

CALL TOLL FREE: 1-800-833-8119 (PURCHASE)

SAN ANTONIO (512) 349-8865 (LEASING)

MEMPHIS (901) 756-7685 (LEASING)

DONT MISS THIS TERMINAL SALE

SCHERERS

LET'S GET ACQUAINTED TERMINAL SALE

DEC TERMINALS

PRICES SO LOW WE DARE NOT PRINT THEM!!!

IF YOU SNOOZE — YOU LOSE!!!

Immediate Delivery

Full 90 Day Warranty

In Stock

(614) 889-0810

Brand New
- VT100
- VT101
- VT102
- VT131
- VT125
- VT220
- VT240
- VT241
- LA12
- LA50
- LA120

Prices subject to change without notice

DONT MISS THIS TERMINAL SALE

DONT MISS THIS TERMINAL SALE

DONT MISS THIS TERMINAL SALE

DATA GENERAL

Hanson Data Systems

FOR SALE

PDP 11/70 System, New (1980)

(1) CPU w/2,048 Kb memory
(1) RM03-AA 67 Mb disk drive
(1) LA120 console printer
(1) FP11C floating point processor
(2) DH11AD 16 line Asynch mux E.I.A.
(1) BA11KE cabinet w/H7420 batt. back-up

PLUS D.E.C. software incl. RSTS/E-V 7.1 operating system, RMS-11, Basic + 2-V 1.6, D.E.C. Cobol-V 4.4 .... ABOVE PRICED AT $49,950

PLUS

(3) CDC 9766 300Mb disk drives .... $6,950 ea. Serials 5795, 14825, 36322
(1) D.E.C. RM05 handler $750
(1) SC70-B3 Emulex 4-disk controller $3,950
(1) Cincom "Total" data base mgmt., license only $6,550
(1) DPD Saver V 2.7 back up utility, license only $850
(5) 300 Mb disk packs .... $375 ea.
(2) 80 Mb disk packs .... $200 ea.

CURRENTLY OPERATING (UNDER MAINT. CONTRACT)

SHEPHERD DATA SYSTEMS
(213) 723-7777
A.C. Bustamante

Not a virtual machine — a real machine

3083 E 16

Available Immediately

w/wo M.G. Set

SERIAL #21770

Any Term Lease

3803 - 02
Tape Controller

3420 - 08
Tape Drive

(818) 986-2411

EL CAMINO
RESOURCES LTD.
4827 N. Sepulveda Blvd.
Sherman Oaks, CA 91403

We Buy & Sell

DEC

Systems
Components

igital
omputer
esale

call:713
445-0062

800 Kenrick Ste C22
Houston, Tx 77060

For Sale

100 New In The Box QUME Sprint 9/35

LETTER QUALITY PRINTERS

With KSR And Factory Warranties

List Price $2,270.
Our Price $950.

Quantity Discounts Available

Meadowlark Enterprises Inc.
Essex Street, P.O. Box 308
Middleton, MA 01949
(617) 777-4666

FORSYTHE McARTHUR ASSOCIATES, INC.

NEW LEASE PROGRAM

3178, 3179, 3180

2 Or 3 Year Term Low Monthly Rent

Customized Flexibility

Hdqtrs: Skokie, IL (312) 675-8000

Atlanta (404) 953-9457 Milwaukee (414) 785-8544

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's
Classifieds work.

Issue Dates: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Turnkey Systems and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:________columns wide by________inches deep.

Issue Date(s):________________

Section:________________

Signature:________________

Name:________________

Company:________________

Title:________________

Address:________________

Telephone:________________

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING,
375 Cochituate Road, Box 880,
Framingham, MA 01701

SERIES 1.
NEW, USED, FEATURES, & CDC PERIPHERALS.
HARD TO FIND NEW PRODUCTS IN STOCK.

34, 36, 38.
S/36's UNDER IBM LIST.
72 HOUR UPGRADES, S/38 FEATURES.

4331/4341.
TAPE, DISK, PRINTERS,
FLEXIBLE LEASE ALTERNATIVES.

5110, 5120, S/23.
DISPLAYWRITERS IN STOCK NOW.

800/328-3884
IN MINNESOTA, CALL 612/339-3042

We do an exceptional job— our clients do repeat business.

X-ceptional!

XERXES COMPUTER SALES
1614 Harmon Place
Minneapolis, MN 55403

Why Lock Yourself Into A Long-Term 3380/3880 Commitment With A V.P.A.?

COMDISCO

3375's A1, B1, B1, D1 Available 12/1/84 Sale/Lease	**4341's** Lease Terms 1-5 Yrs. **4381's** Sale/Lease	**Printers** 3800 3211 1403 3800 4245 4245 3262 3262 3287 Immediate Delivery
Controllers 3880 3274 3803 3276 Display Stations 3278 3178 3279 3277	DASD 3380 3375 3370 3350 3344 3310 Immediate Delivery	TAPE DRIVES 3420 3430 3410 8809 Immediate Delivery

We Buy, Sell & Lease IBM Processors and Peripheral Equipment

Computer Marketing Inc.
P.O BOX O
MARGATE, NJ 08402-2223
609/823-6000 • 800/345-0005
Contact/Bernie Gest

CDLA

Established 1969

ONLY 29 SHOPPING DAYS LEFT

[illegible] END [illegible] UPON [illegible]

☐ We have the following equipment available for...
☐ Sale ☐ Trade ☐ Lease Renewal

Machine ________ Model ________ Quantity ________ Features ________

☐ We are currently considering the ☐ purchase ☐ lease ☐ COMBINATION of these models...

Machine ________ Model ________ Quantity ________ Features ________

As a result of completing this form, a NO OBLIGATION QUIKQUOTE™ will be prepared and sent within the next 48 hours for your consideration.

For even faster response or to discuss the specifics of your anticipated equipment change, call **TOLL-FREE, 800-328-6729.**

NAME ________
TITLE ________
COMPANY ________
STREET ________
CITY ________ STATE ________ ZIP ________
TELEPHONE ________

If between now and December 31, 1984, you are planning to purchase, lease or dispose of IBM equipment (all models), IT'S TIME TO START SHOPPING.

Depending on the model, we can deliver and install before the end of the year.

Dataserv is a true one-stop shopping center for IBM systems and peripherals. We have the availability, selection, financial flexibility and after-sale support you need.

We've been a reliable source for IBM computing equipment for almost 15 years.
RETURN THIS COUPON TO RECEIVE YOUR PERSONALIZED DATASERV QUIKQUOTE™.

dataserv
When you know why and what to buy. Let us show you how.

DSI

WE BUY SELL & LEASE!

BURROUGHS

Discover the DSI alternative.

800-641-5215
All equipment available immediately and guaranteed for Burroughs Maintenance

DSI Serving the Burroughs Community Worldwide
1446 So. Lipan, Denver, CO 80223 (303) 777-8211
Telex 756-182

IBM
3270

I B M
SYSTEM 36

New Processors
Printers & Displays

Priced Substantially Below IBM List

Software Included

Order Now For Delivery Before Year End

LIBERAL TRADE IN ALLOWANCES

CPU SALES & LEASING, INC.
205 NORTH PAGE STREET
PORTLAND, OREGON 97227
NATIONAL 800/222-2226
OREGON 503/222-2226

ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS

CPU

IBM SERIES I PROCESSORS PERIPHERALS

4300

34 36

38

1-800-328-7938

data 3

computer corporation

11000 PRAIRIE LAKES DR. • EDEN PRAIRIE, MN • 55344

PRICE BUSTERS!

S/36 IBM S/38

Who You Gonna Call?

CALL CARLYN!

800-828-4227

in VA 703-642-1950

CARLYN

COMPUTER SYSTEMS

5105Q BACKLICK ROAD. ANNANDALE. VA 22003

FORSYTHE McARTHUR ASSOCIATES, INC.

NEW LEASE PROGRAM

IBM 4381

2 Or 3 Year Term
Customized Flexibility

Low Monthly Rent
Your Delivery Position Or Ours

Hdqtrs: Skokie, IL (312) 675-8000
Atlanta (404) 953-9457
Milwaukee (414) 785-9544

The nationwide market – a call away!

DEC/DG

SYSTEMS/PARTS/PERIPHERALS

NEW/USED/SURPLUS • DISCOUNT PRICES

Since 1977! Buy, Sell, Trade and Broker.

PHIL	***BRYAN***	***JENNIFER***
DG	11-VAX	8-LSI

CALL TODAY • (305) 392-2005 TELEX 568-670

thomas business systems, inc.
4301 Oak Circle - Unit 11 Boca Raton, Florida 33431

BUY • SELL • LEASE

SERIES-1

34 • 36 • 38 • 23

4300 3705 3706 3725

Upgrades

Tubes • Printers • Tapes • Disks

AMCOM
CORPORATION

5200 W 73RD ST • MINNEAPOLIS, MN 55435
(612) 835-4737

CALL TOLL FREE
800-328-7723

The State of California is interested in purchasing a geographical mapping system for under $75,000. A turnkey workstation approach to include a digitizer, processor, disk storage, mag-tape unit, and printer is preferred. Qualifying systems must have minimum 6 months in field installation.

Contact:
Department Of Conservation
1416 9th Street
Sacramento, CA 95814
Attn: Dan Hammond
(916) 323-0892

[illegible]

3178 IBM C20 s

[illegible]

CALL PENNY [illegible]AKOWSKI

800 426 4341

[illegible]

4341

Available Now
For Lease or Sale
For Information Call

Regional Computer Sales Corporation

(313) 656-1900

There's No Time For DOWNTIME!

And that goes for your business as well as your computer system!

So, while the industry works on your system's problems, let us work on your business problems. Advertise in–

COMPUTERWORLD CLASSIFIEDS!

One insertion will let a potential audience of over a half a million readers know what you are looking for or have to offer. Whether you are looking to recruit computer professionals, want to buy, sell or lease equipment, have computer time or services to offer, or software packages to sell, and more, Computerworld Classifieds will help you get a lot of exposure and get things done faster.

The open line rate is $9.15 per line and there is a minimum size of 1 column by 2" at a cost of $256.20. We can accomodate up to 5 columns and depth measurement increases by half inch increments.

Ads may be mailed in, cleanly typewritten, with a letter stating the size desired and the issue in which it is to be run. Our adtakers will take ads that require no extensive artwork or borders over the phone. We also provide telecopier service.

Any borders, logos, or artwork should be sent in with your ad and must be dark and clear enough to be reproduced.

Computerworld comes out every Monday and our deadline for receiving ads is 10 days (or six working days) prior to the issue date desired.

First time advertisers must send either payment or a purchase order along with their first ad.

Our mailing address is:

Classified Advertising
Computerworld
Box 880, 375 Cochituate Road
Framingham, Mass. 01701
800 343-6474; (617) 879-0700

The Bulletin Board

HONEYWELL

LEVEL 6 & DPS 6 EQUIPMENT
NEW & REFURBISHED
Systems • Peripherals • Memory
CRTs • Applications Software
ANNOUNCING 3 COMPATIBLE
[illegible] PRODUCTS
• 1000 And 1200 LPM Band Printers
• [illegible] MB Winchester Disk Drives
• [illegible] CRT ([illegible])
[illegible]
VIP 7801/8, 7804E And 7814
Low Prices - Prompt Delivery
[illegible] Computer
Services Ltd.
100 [illegible] Rd.
Northboro, MA 01532
(617) [illegible]
TWX 710-347-7574

---

(4) 100 Mb MSU
400 Disk Drives
$2,000 Each Or Best Offer
Contact Joe Ennis
(904) 737-7730 Ext. 130

DEC

FALL SPECIALS

CDC 9766, Refurb	$4,500
LA 36, Unused	399
L0006, Used	3,000
LP14-CA, New	6,900
RA80-AA, Unused	9,800
RP07 (50 HZ-60 HZ)	17,000
TS11-CA, Unused	2,999
TU77 Slave	10,500
TU78 Master, Unused	27,500
VAX 780XA-AE,New	121,500

DEC [illegible] computers available
SEVCO INC.
(617) [illegible]
(617) [illegible]

DEC BARGAINS

11/34A CPU Set	$1,400
11/44 KS44-A "CIS"	$2,775
11/44 CPU Set KD11Z	$4,800
BDV11-AA	$[illegible]
DL11-W	$[illegible]
DR780-AA	$[illegible]
FPF11	$1,175
FP11A	$1,075
KK11-A	$1,400
MK11-CE	$[illegible]
MS11-LD	$[illegible]
MS11-MB	$[illegible]
MS11-PB	2,940
MS780-DD	$[illegible]
MSV11-LF	$700
MSV11-PL	$1,275
VAX 1MB MS730-CA	$1,875
VAX 1MB MS750-CA	$1,875
VAX 1MB MS780-FD	$2,[illegible]

Call Ray at [illegible], Inc. (617) [illegible]

DEC NEW & USED
BUY - SELL - EXCHANGE
Systems • Processors • Memory
Options • Peripherals • Modules
LAKEWOOD COMPUTER CORP.
P.O. Box [illegible]
San Jose, CA [illegible]
(408) [illegible]

VAX 780
Immediate Availability
Short Or Long Term Leases
[illegible] Associates
[illegible]
New York (516) 273-7777

D.E.C. SPECIALS
VAX 11780 [illegible] MB $[illegible]
1170 Core 1/2 MB $[illegible]
(3) RP04's, (1) TWU16, (1) DH11-AD
RP06 Spare Parts Call
Printer Consulting Services Inc.
P.O. Box [illegible]
[illegible], CT [illegible]
(203) [illegible]

DEC EQUIPMENT
VAX-UNIBUS-QBUS
NEW & USED
SYSTEMS OR OPTIONS
VAX11780 READY FOR LEASE NOW
1MB, (2) RM05, TU77, DZ11, DMR11
U.S. RESALE
408-727-1113

DEC

NEW DEC SYSTEMS
40% OFF LIST
[illegible]
[illegible]
1 [illegible] Floppy Drive
[illegible] Memory
[illegible] 4 Line Controller
[illegible] O.S. License
11/70s, Other Configurations
Call DEC Systems (617) [illegible]

For Sale
PDP11/23
With RL01 Disk Drive (2), 256K Memory, LA180 & LA120 Printers, 2 CRTs, 16 Disks and Off Site Portable Case.
$[illegible] O.B.O.
[illegible]

"Buy"Sell"Lease"Maintain"
New & Used
DEC Equipment
Southwest Automation
Houston, Texas
713/[illegible] Inside Texas
800/231-[illegible] Outside Texas

NEW VAX
11/730
System R80/RL02
$29,950
Access International
Glenn Freeman
617-[illegible]

BUY • SELL • TRADE

11725	HP113-A	RA81-AA
11780-FA	KMC11-A	RM80-AA
BA11-KE	KMC11-B	RM05-AC
BA11-KU	LA120-DA	RX211-BK
BC20N-[illegible]	LP11-CA	TS11-BA
FP11-F	RA80-CA	VT[illegible]

NEW YORK COMPUTER EXCHANGE
(516)752-[illegible] (800)[illegible]

FOR SALE BY OWNER
(2) RP20, (3) RP07
(2) RH20, DIC20
Guaranteed Maintainable
Case Western
Reserve University
Dennis Rosen
(216) [illegible]

PRIME

LARGE SELECTION OF USED
PRIME COMPUTER SYSTEMS
...SAVINGS TO 50%
Peripherals also available
1st SOLUTIONS, INC.
2001 EAST CAMPBELL AVE.
PHOENIX, ARIZONA 85016
(602) 957-0966
ASK FOR DON OR MATT

HEWLETT PACKARD

Buy-Sell-Lease
HP3000 3X, 111, 4X
and related peripherals
Call Carol
CSU INDUSTRIES, Inc.
516-239-4310

HEWLETT PACKARD
1000 • 2000 • 3000
SYSTEMS & PERIPHERALS
BUY & SELL WORLDWIDE
EURODATA, INC.
(613)726-[illegible]
Tlx: [illegible]

HP-250
SYSTEMS • PERIPHERALS • MEMORY
26220 Emulation Software
For HP-150/9816/125/IBM-PC
New & Used HP
Personal Computers
XMITAL DATA COMM
(408) 747-1230

HEWLETT PACKARD

HP 3000
BUY • SELL • RENT • LEASE
Complete Systems
Processors • Peripherals • Parts
[illegible] Corporation
Santa Monica, California
(213) [illegible] (800) [illegible]
Telex: 215 [illegible] FCS UR

HP 1000 HP 3000
7906M/S Discs
Available for Sale, short and long term rental, and lease at very attractive prices.
Call the HP Specialists Today!!
Computer Solutions, Inc.
(201) [illegible]

BASIC FOUR

BASIC FOUR
MODEL 730
2 [illegible] Disk Drives, CPU 128K plus Lightning, 8 Ports, 1 7200 Terminal, 6 Disk Packs.
Call Joe
(513) 474-8000
$[illegible]

BURROUGHS

BUY SELL LEASE
BURROUGHS
Equipment Dealers
Since 1977
Over $4,000,000
In Stock
Computer Provisions
(216) 248-7878
(Member IBDA)

WANG

DESIRABLE EQUIPMENT-
AVAILABLE NOW!!!

(1)	Wang VS-80 1 Mb CPU & IOPs	CALL
(1)	Wang 5574 1100 1 pm Band Printer	22,000.
(2)	Wang 5573 [illegible] 1 pm Band Printer	[illegible]/EA
(1)	Wang 2509-V Dual Density Tape Drive	9,800
(2)	Wang 2288V-2 288 Mb Disk Drive	12,500./EA
(30)	Wang Ergo-2 32K O.P. Workstation	1,800./EA

ALL UNDER WANG MAINTENANCE
AND AVAILABLE
NOVEMBER & DECEMBER.
SUBJECT TO PRIOR SALE.
Call Dwight Kranz
(617) 372-8536.
CFR Associates, Inc.
Haverhill, MA 01830

EQUIPMENT AVAILABLE
VS85
8 MONTHS OLD
[illegible]
[illegible]
(800) 277-[illegible]

WANG

ERST is The Leading Dealer
In WANG Equipment:
2200 • VS • WP • PC
CPUs, Terminals, IOPs,
Controllers, Printers,
Memory Upgrades.
Plug Compatibles.
Rental And Leasing Prices
Quoted On Request.
Call Toll Free:
1-800-FOR ERST
In New York: (212) 431-1100
ERST International
Corporation
225 Lafayette Street
New York, NY 10012

WANG VS SOFTWARE SPECIAL
Limited Time Offer
MCBA • CURRENT RELEASE #[illegible]
$1,[illegible] Per Package
AR, AP & GL
CONTRACT PROGRAMMING
AND CONSULTING SERVICES
CLIFF DATA SYSTEMS, INC.
(201)[illegible] (212)[illegible]

Your ad
can be here
for
$130

MISC. SYSTEMS

FOR SALE
DICTAPHONE
DUAL DISPLAY
WORD PROCESSING
SYSTEM
Includes display keyboard
CRT, Diablo printer,
twin sheet feeder, dual
diskette drive, print wheels,
and 50 floppy disks
Price $12,000
Call Jeff or Kurt
(717) 858-1176

For Lease
IV Phase Mini Computer
IV/95 Processing Unit
Includes nine Input Terminals with one Printer and Controller and one Magnetic Tape Drive and Controller
Contact Bertha Barton
(801) 467-[illegible]

IBM

3083 E 16
Available Now
12 Month or
Longer Lease
Very
Aggressive
Lease Price
Call For
Lease Rate
Call Dave or
Mel at
(818) 986-2411

IBM

BUY SELL LEASE TRADE
S/34 - S/36 S/38
Available Now All System 34
Upgrades And Features
5340-C23, E36, F37
5360s All Models
3262s
5256 Model 3s
5251 Model 11s
5291 Model 1s
5251 Model 12s
Immediate Delivery -
Guaranteed IBM Maintenance
PROCOM
"The Professional
Computer People"
(212) 279-1717

3278-2/5 3278-2/12
You call today
We ship tomorrow
Sale or Lease One or Fifty
Month to Month Rental
Available
Express Leasing Inc.
San Diego
(619) 457-8030

FOR SALE/LEASE S/34 Upgrades & Sys.)
64 Meg Upgrade (S/34)
S/34-C23 [illegible] $[illegible]
S/34 Memory (Any Increment)
Magazine or 3D Diskette Rdr. (S/34)
Series 1 (1296) WANTED
[illegible] S/34 & 3810
[illegible]
DATAMARC (404)[illegible]
[illegible] Roswell Rd., Atlanta, GA [illegible]

For Sale
IBM SYSTEM 34's
Any Model or Configuration
Disk and Memory Upgrades
Available Within 30 Days
5340-C22 $[illegible]
Eligible For IBM Maintenance
Call Pat
(312) [illegible] ext. 6

Buy .....Sell..... Lease
IBM MICR
3890 - 1419
1255 - 3694
(813) 722-4534

SYSTEM 34
UPGRADES
Memory • Disk • Magazine
• Communications
1-800-LEAS-PAK
In Texas call 817/[illegible]

IBM 3101
70 Terminals With Modems
$1,100/Offer
Contact Myron Schwartz
(408) 973-9333

FOR SALE OR LEASE
IBM 3203-5 Printer
Targe Financial, Inc.
512-544-0800

FOR SALE
IBM
3275-01 CRTs
With 4631 Keyboards
Bisync Communications
Call: 713-546-7828

IBM SYSTEM 38
MODEL 4
WITH 1 3370
CALL KATHY
512-478-3448

IBM

FOR SALE
4331-K2
w/[illegible] Attachment
Comm. Lines Available
Call Bill Hagen
Computer Merchants Inc.
(914) [illegible]

CABLES
Series/1
System 34/36/38
IBM PC's
Pioneer Cable Company
(318)[illegible]

FOR SALE
4341-2
8 MB Processor
w/[illegible] Console
Available Now
Call Bill Card
Computer Merchants Inc.
(914) 238-[illegible]

SYSTEM/36
DECEMBER DELIVERIES
Of upgrades, Systems
and Peripherals
(212) 279-4467
(713) 627-7117

BUY - SELL - LEASE
SERIES 1
Processors and Peripherals
Call Louis Felder
Computer Merchants Inc.
(914) 238-8631

PRINT TRAINS
IBM 1416 & 3216
Bought - Sold - Lease
Repaired - Reconditioned
COMPU-ACT COMPANY, INC.
(813) [illegible]

QANTEL

QANTEL [illegible]
[illegible] MT Drive
[illegible] LPM Printer
SYSTEM [illegible]
[illegible]
150 CPS Printer
Floppy Drives
[illegible] Mem.
& VT's
(714) [illegible]

AMDAHL

Amdahl 4705E
$75,000/Offer
Contact Myron Schwartz
(408) 973-9333

More
Bulletin
Board
on the
next page.

MISC.

Buy • Sell • Lease
• Short Term Rentals •
IBM & DATAPOINT
AVAIL IMMEDIATELY
Cougar Computer Corp.
[illegible]
Member CDLA

DATA GENERAL

NPA SYSTEMS, INC.
SPECIALS: MV8000's - 1 MB
Max Memory (new)
S280's - 1 MB (new)
S/140's - 1 MB
CRTS: D-210, D-211, D-410
CALL FOR INFORMATION:
516-467-[illegible]

DG/ONE PORTABLE
Desktop Generation • CRTs
Immediate Delivery
Systems, Software, Service
Copley Systems
(617) 769-8430

2060 - 2 Yrs. Old
WILL UPGRADE TO 2065
2 Mb, 2 TU78-AAs,
2 LP20s, 1 RTP20-FA
5 DC20-AAs, 7 DC20-DAs, more
Continuous DEC Maintenance
AVAILABLE IMMEDIATELY
For Sale by Owner
(617) [illegible]

NEW DG CRT's AT NEW LOW PRICES
D-210 ___ $[illegible] D-410 ___ $1[illegible]
D-211 ___ $[illegible] D-460 ___ $1[illegible]
Prices Include Maintenance Program
Data General/One Portable Computers
In Stock at Low Low Price
Any & All DG Cables In Stock
[illegible] Data Systems (516) [illegible]

THE BULLETIN BOARD

A Low-Cost Way to Sell Hardware and Software in Computerworld.

What is The Bulletin Board?

It's a classified section in Computerworld designed especially for the selling and buying of individual pieces of hardware in e convenient, low-cost format. It is especially suited to companies that have a piece of used equipment they want to sell. For one low price, you can inform more than half a million Computerworld readers around the country of your equipment's availability.

How Does The Bulletin Board Work?

Bulletin Board ads come in standard units (one column wide by one inch deep) and standard typefaces. (Units may be combined to produce deeper ads, but one column is the maximum width and no units of less than one inch are available.) Ads are arranged under headings (such as "IBM", "DEC" or "Printers"). The headline of the ad is set in larger, bold type, and should contain the standard equipment identification. The body copy should describe the equipment very briefly and give the person to contact. This is all the information an interested buyer needs to follow up. No ad should have more than one piece of equipment or software.

The price for each standard unit is only $130.00. There is e one unit minimum and no fractional units available.) Anyone can place an ad, but no agency commissions are paid, no quantity discounts allowed, and no credit toward rate is given for contract advertisers who advertise in other sections of Computerworld. It's a simple and effective system for buying and selling hardware and software.

How to Place an Ad in the Bulletin Board.

Ads are accepted in the mail, by phone or by telecopier. Ads can be accepted up until the Monday before issue (7 days in advance of issue date). You should write out your ad before submitting it. (The standard size will hold approximately 25 words of copy.)

Once you've written your ad, send it in with the coupon or call one of our ad-takers. (If your company has never advertised with us before we request a check with your order.)

Remember that all ads are standard. No special typefaces, no borders and no logos are allowed. Ads are set on e six-column page in our classifed section under the heading "The Bulletin Board.". We assume no liability for errors beyond the price of the ad in the case of material errors.

ORDER FORM
COMPUTERWORLD
BULLETIN BOARD

Issue Date: Ads can be accepted up until the Monday preceding the issue desired. Computerworld comes out every Monday.

Classifications: Most ads will be classified according to the brand of equipment that is being bought or sold. These classifications include Burroughs, Data General, Digital/DEC, Hewlett Packard, Honeywell, IBM, NCR, Sperry Univac, Salvage, Terminals, Misc. Systems and Miscellaneous.

Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be clearly typewritten. Ads may be given over the phone to our team of ad takers. The standard size is 1 column by 1 inch deep. These units may be combined to form larger sized ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. (No borders or logos are allowed.

Cost: The price for each standard unit is $130.00 (One unit minimum and no fractional units allowed.) There are no agency commissions and no quantity discounts.

Billing: Once you've written your ad, send (or call) it in with your name and address for billing purposes and we'll run it. (If your company has never advertised with us before, we request a check with your order.)

Issue Date(s):______________________
Signature:______________________
Name:______________________
Title:______________________
Company:______________________
Address:______________________
Telephone:______________________

Send this form to:
COMPUTERWORLD BULLETIN BOARD
375 Cochituate Road, Box 880,
Framingham, MA 01701

617-879-0700 800-343-6474

SOFTWARE FOR SALE

Award-Winning

Featuring:
- *Date-Insensitive Processing*
- *Large Scale Integration*
- *User-Defined Vocabulary*
- *Paperless Processing*

General Accounting
Accounts Payable
Accounts Receivable
Equipment & Fixed Assets
Financial Reporting
Planning & Budgeting
Job Cost Accounting
Payroll/Personnel
Book to Tax Accounting
Order Processing
Inventory Management
Sales Analysis
Oil & Gas
Spread Sheet Processor

J.D. Edwards & Company

4949 S. Syracuse / Suite 5000
Denver, CO 80237
303/ 773 3732

Dallas — 214/ 458 0636
Houston — 713/ 960 8278
San Francisco — 415/ 571 5755
Newport Beach — 714/ 955 0118
Bakersfield, CA — 805/ 327 1911
Tulsa — 918/ 493 1477

IBM Value Added Remarketer

IBM SERIES/1
($FSEDIT USERS ONLY)
Make your life easier! Switch to H&A's EXEDIT. Much faster & more productive. EXEDIT is very easy to use. Realistically save 1 hour per day per programmer. A must for 3101B & 4978/9 terminals. You have to see a free demo diskette to believe it.
H&A COMPUTER SYSTEMS
(415) 434-3617

- Easy to use menus
- Book and tax depreciation
- Multi-division or multi-company
- Disposal reporting
- Property tax reporting
- Depreciation forecasting
- Acquisition reporting
- Interfaces to General Ledger
- For VAX VMS or RSTS E
- Datatrieve compatible

Plycom services, inc.
P O Box 160
Plymouth, IN 46563
EAST (317) 742 5380
WEST (214) 986-0507

Hardware, software, problems, people, pricing, ethics, litigation, communication, macros, minis and micros.

We like to make an issue of it. EVERY WEEK.

SOFTWARE FOR SALE

SELLING SOFTWARE?

SELL IT HERE.

Place your ad in the BUY • SELL • SWAP pages of COMPUTERWORLD

Call Computerworld To Place Your Ad
1-800-343-6474 or
(in Mass.) 1-617-879-0700

LPCUT
A Proven Name-and-Address Processing Utility to:

- Format & Print Labels
- Select Input Records
- Reformat Records
- Create Customized Listings
- Translate, Pack or Unpack Selected Fields
- Insert Sequence Numbers & Literals

Call or Write:
List Processing Company
555 Waters Edge
Lombard, IL 60148-6404
1-800-MAILERS
In Illinois (312) 932-7000

SYSTEM 38 SOFTWARE!

We sell S/38 Software products nationwide. If you'd like us to sell or distribute your software or related products to over 7,000 prospects every month, please write in total confidentiality to:

Software/38
P.O. Box 30283
Indianapolis, IN 46230

AD SPACE For Sale

Call 1-800-343-6474
(In Mass.) (617) 879-0700
or send materials to:
COMPUTERWORLD Classifieds
Box 880
375 Cochituate Road
Framingham, MA 01701

LOW COST SOFTWARE
For IBM Systems 34/36
*Accounts Receivable/Billing * Payroll
*Inventory Control * Accounts Payable
* General Ledger *
Preliminary Documentation Available
One Time Purchase -
No Additional Expense
$250 Each
Or All Five Systems For $1,000
Contact
L. N. Morris & Assoc., Inc.
909 Riverside Drive (919) 228-9983
Burlington, NC 27215 (703) 228-8517
We Transform "Computerese" Into "Computer Ease"

TIME & SERVICES

VAX 11/780 AND PDP-11 DEVELOPMENT TIME

NO KILOCORE TICK CHARGES / NO CPU CHARGES

Omnicomputer

$7/$14
RSTS/E VMS
PER HOUR CONNECT TIME

LANGUAGES & PACKAGES AVAILABLE
BASIC PLUS
BASIC PLUS 2
PASCAL
COBOL
C
FMS
DATATRIEVE
FORTRAN
MUMPS
MACRO
WORD-II
DIGICALC
SPSS
WAFE
TECO
RMS
RSX EMULATION
RT-11 EMULATION
CUFFS-80

OMNICOMPUTER'S SERVICES
- ☐ TIMESHARING
- ☐ APPLICATION SOFTWARE SERVICES
- ☐ MAINTENANCE SERVICES
- ☐ BACK-UP SERVICES
- ☐ SOFTWARE DESIGN
- ☐ BUY, SELL, AND LEASE SERVICES
- ☐ EXECUTIVE SEARCH
- ☐ SITE SURVEYS
- ☐ MIS CONSULTING
- ☐ INSTALLATION SERVICES
- ☐ LASER PRINTING SERVICES

BUDGET BYTES*
212-944-9230

Omnicomputer, Inc.
1430 Broadway, New York, N.Y. 10018

COMMERCIAL DATA PROCESSING
4341-2 370/168-3
OS-DOS-VM/CMS
CICS-ROSCOE
REMOTE JOB ENTRY
CICS DEVELOPMENT
CUSTOMIZED SOFTWARE
XEROX LASER PRINTING
Contact Greg Garab
(201) 777-3464
15 MINUTES FROM LINCOLN TUNNEL
ONE PASSAIC STREET
WOOD RIDGE, N.J. 07075

COMPUTER TIME & TIMESHARING

- We broker computer time.
- IBM timesharing our specialty.
- NEVER a charge to the Buyer.
- Our fees paid by the Seller.

Call Don Selden at
Computer Reserves, Inc.
(201) 688-6106

MODELING, PROJECTIONS, HEAVY BATCH

with VSAPL, ADRS, ADI, SAS, APE, GPSS, MPSX or your own programs. Full capacity of an IBM 3033 for daytime use in western U. S. at reasonable prices.

PRIMDATA OF SWEDEN
44 Montgomery St . Suite 500
San Francisco, CA 94104 • Tel (415) 955-2612

Use the classified pages of COMPUTER WORLD to tell everybody about the TIME & SERVICES you have to offer

To place your ad, call us at 1-800-343-6474 (In Mass., call 617-879-0700) or send all materials to:

COMPUTER WORLD
Classifieds, Box 880
375 Cochituate Road
Framingham,
MA 01701

VAX TIME
CHOOSE THE PLAN BEST FOR YOU:
A @ $4 CPU SEC & $2 CONNECT HR.
B @ $12 PER CONNECT HOUR
C @ $600/MONTH & 10 MB DISK
NO CPU CHARGES ON PLANS B & C.
PROGRAMMING SERVICES AVAILABLE
AVAILABLE NATIONWIDE VIA TELENET
CORPORATION
(714) 99VAX11
(714) 966-6041

COMPUTER TIME
IBM 370-148
8/3420, 6/3350,
6/3330-11, 3704
DOS VSE Release 3
CICS/ICCF
Dynam/D, Dynam/T
2 Meg Real
On-Line Available, Office Space, & Technical Support
(516) 499-1222

DATA PRINTER SALES
Model's 6644 - 1200 Series
Spares Discounts 10% to 30%
Per Call: Service, Ribbons
Refurbs, Maint Contracts
Printer Consulting Services
P.O. Box 265
Plantsville, CT 06479
(203) 621-6356

COMPUTER TIME RENTAL
IBM 3083B
OS MVS/SP JES2
INTERACTIVE TSO/SPF
LOCAL OR REMOTE BATCH
RJE, BISYNC, SDLC
TECHNICAL SUPPORT & OFFICE SPACE AVAILABLE
ALL SHIFTS -
DISCOUNT FOR NON PRIME
INTERNATIONAL COMMUNICATIONS
CBI INDUSTRIES, INC.
JOHN FULKERSON
(312) 654-7328

CLASSIFIED ADVERTISING ORDER FORM

Computerworld's Classifieds work.

Issue Date: Ad closing is every Friday, 10 days prior to issue date.

Sections: Please be sure to specify the section you want: Time and Services, Software for Sale, Position Announcements and Buy/Sell/Swap. (Available upon request: Software Wanted, Business Opportunities and Real Estate).

Copy: We'll typeset your ad at no extra charge. Please attach CLEAN typewritten copy. Figure about 25 words to a column inch, not including headlines.

Cost: Our rates are $128.10 per column inch. (A column is 2" wide.) Minimum size is two column inches (2" wide by 2" deep) and costs $256.20 per insertion. Extra space is available in half-inch increments and costs $64.05. Box numbers are $15.00 extra.

Billing: If you're a first-time advertiser, (or if you have not established an account with us.) WE MUST HAVE YOUR PAYMENT IN ADVANCE.

Ad size desired:__________columns wide by__________inches deep.

Issue Date(s):____________________

Section:____________________

Signature:____________________

Name:____________________

Company:____________________

Title:____________________

Address:____________________

Telephone:____________________

Send this form to:

COMPUTERWORLD
CLASSIFIED ADVERTISING,
375 Cochituate Road, Box 880,
Framingham, MA 01701

Foreign Editorial/ Sales Offices

England: Martin Durham, CW Communications Ltd., 99 Greys Inn Rd., London WC1 8UT. Phone: 01-831-9252, Telex: 262346.

Euan Rose, Bill Dunlop, Stephen Thomas, Beers Hobson Assoc., 345 Goswell Rd., Islington, London EC1V FHN. Phone: 01278 3415/6 (reps for all CWCI publications except Computer Management and Computer Business Europe).

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

France: Axel Leblois, Computerworld Communications S.A., 185 Avenue Charles De Gaulle, 92200 Neuilly Sur Seine, Paris. Phone: 758.14.14. Telex: 613234 F.

Japan: Mr. Shuji Mizuguchi, Computerworld Japan, 7-4 Shintomi 1-Chome, Chuo-ku, Tokyo 104. Phone: (03) 561-3882, Telex: 252-4217 (Computerworld Japan only).

H. Kajiyama, Tokyo Representative Group, Sanshin Kogyo Bldg. 3F, 2-10 Kanda Jimbo-cho, Chiyoda-ku, Tokyo 101, Phone: (03) 230-4117/8, Telex: J26860 (reps for all CWCI publications except Computerworld Japan).

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: AA74752 COMWOR.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th Floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Richard Small, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F. Phone: (905) 514-4218, (905) 514-6309. Telex: 1771300 ACHAME, 1777809 ACHAME.

Spain: Neil Kelley, Computerworld/Espana, Barquillo 21, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Denmark: Preben Engell, Computerworld/Denmark, Gammel Strand 50, 1202 Copenhagen K. Phone: 01-1234-11. Telex: 27566 cwdan.

Sweden: Bengt Marmfeldt, Nova Media, Nova Media AB, Vartavagen 55, 11538 Stockholm. Phone: 08-234280. Telex: 8105099 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir.; Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Italy: Daniele Comboni, Gruppo Editoriale Jackson, s.r.l. Via Rosellini 12, 20124 Milano.

Argentina: Ruben Argento, Gen. Mgr., Computerworld Argentina, Av. Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: 34-5583/5584. Telex: 22644.

Norway: Mr. Morton Hansen, Gen. Mgr., CW Norge A/S, Hovinveien 43, P.O. Box 2862, Toeyen, Oslo 6. Phone: 2/647725. Telex: (856) 7647725.

Southeast Asia: Mr. David Naidu, General Manager, Asia Computerworld, Pte. Ltd., 11-08/11-10 Goldhill Plaza, Newton Road, Singapore. Phone: 250-4444. Telex: (786) RS 37003

Melvyn Bennett, Regional Sales Mgr., Asia Computerworld Pte. Ltd., 2022 Swire House, 9 Connaught Rd. Central, Hong Kong. Phone: 210385. Telex: (780) 72627 HX COMWR.

Saudi Arabia: Mr. Omar Dusuki, General Manager, Saudi Computerworld, P.O. Box 5455, Jeddah. Phone: 6519680. Telex: (928) 401205.

ADVERTISERS INDEX

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Computerworld Sales Offices

Publisher/Vice-President/Donald E. Fagan

SAN FRANCISCO SALES OFFICE (415) 421-7330
Western Regional Director/William J. Healey
Senior District Manager/Barry Milione
District Managers/Ernie Chamberlain, Mark V. Glasser,
Barbara Crane
Account Manager, Classified/Nicole Boettcher
COMPUTERWORLD, 300 Broadway, Suite 20,
San Francisco, CA 94133

ATLANTA SALES OFFICE (404) 394-0758
District Manager/Jeffrey Melnick
Eastern Regional Director/Michael J. Masters
COMPUTERWORLD, 1853 Peeler Road, Suite D,
Atlanta, GA 30338

HOUSTON SALES OFFICE (713) 952-1220
District Manager/William Mahoney
Western Regional Director/William J. Healey
COMPUTERWORLD, 8401 Westheimer, Suite 110,
Houston, TX 77063

CLASSIFIED ADVERTISING (617) 879-0700
National Sales Manager/Walter S. Kett
Al DeMille
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CW INTERNATIONAL MARKETING SERVICES
General Manager/Diane Le Muraglia
Manager, East Coast/Frank Collins
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700
Manager, West Coast/Isabelle Bertagnolo
COMPUTERWORLD, 1060 Marsh Road
Menlo Park, CA 94025
(415) 328-4564

Director/National Sales/Edward P. Marecki
Manager/Marketing & Sales Operations/Kathy Doyle
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701
(617) 879-0700

BOSTON SALES OFFICE (617) 879-0700
Northern Regional Manager/Ronald Mastro
District Managers/Jim McClure, Michael F. Kelleher
David Peterson, Bill Cadigan
Sales Assistant/Alice Longley
COMPUTERWORLD, 375 Cochituate Road, Box 880,
Framingham, MA 01701

CHICAGO SALES OFFICE (312) 827-4433
Midwest Regional Manager/Russ Gerches
District Manager/Arthur Rosenb[illegible]
Sales Assistant/Joan F. Studerus
COMPUTERWORLD, 2600 South River Road, Suite 304,
Des Plaines, IL 60018

NEW YORK SALES OFFICE (201) 967-1350
Eastern Regional Director/Michael J. Masters
Senior District Manager/Doug Cheney
District Managers/Ray Corbin, Joan Daly, Fred Le Sage
Sales Assistant/Mary Sabo
COMPUTERWORLD, Paramus Plaza I,
140 Route 17 North, Paramus, NJ 07652

LOS ANGELES SALES OFFICE (714) 261-1230
Senior District Manager/Bob Hubbard
District Manager/Bonnie Huckenpahler
Western Regional Director/William J. Healey
COMPUTERWORLD, 18008 Sky Park Circle, Suite 260,
Irvine, CA 92714

CW COMMUNICATIONS/INC.

Board Chairman
Patrick J. McGovern
President
W. Walter Boyd
Executive Vice-President
Lee Vidmer

Publisher/Vice-President, Donald E. Fagan. Group VP-Communication Services, Jack Edmonston. Group VP-Circulation, Margaret Phelan. VP-Finance, William P. Murphy. VP-Editorial, John Whitmarsh.

Computerworld Headquarters: 375 Cochituate Road, P.O. Box 880, Framingham, MA 01701
Phone: (617) 879-0700, Telex: 95-1153.

SALES National Director, Edward P. Marecki. National Sales Manager/Classified Advertising, Walter S. Kett. Manager/Marketing & Sales Operations, Kathy Doyle. Corporate Advertising Administrator, Frank Collins. National Recruitment Sales Manager, Al DeMille. Display Advertising Supervisor, Anne Hadley. Display Advertising, Deborah Bryer, Pam Valentinas, Carolyn Medeiros, George Griffin, Doug Sanborn. Classified Operations Manager, Cynthia Delany.

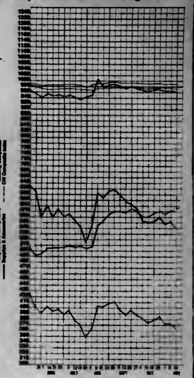
COMMUNICATION SERVICES Group Vice-President, Jack Edmonston. Director Research, Kathryn Dinneen. Sales Promotion Director, Liz Johnson.

PRODUCTION Production Director, Peter Holm. Production Manager, Marlene Stibal. Paste-Up Manager, Trish Gaudette. Systems Manager, Tom Pfau. Typesetting Manager, Carol Polack. Art Director, Tom Monahan. Graphic Designer, Hank Fling.

CIRCULATION Group Vice-President, Margaret Phelan. Circulation Manager, Jane Dosberg. Fulfillment Manager, Maureen Burke.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone (313) 761-4700. Computerworld's [illegible] write to Circulation Dept. for subscription information.

Computerworld Stock Trading Index



Computerworld Stock Trading Summary

All statistics compiled
computed and formatted
by
TRADE QUOTES INC.
Cambridge Mass. 02138

CLOSING PRICES WEDNESDAY, NOVEMBER 14, 1984

EXCH		PRICE 1983-84 RANGE (1)	CLOSE NOV 14 1984	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
O	ALPHA MICROSYSTEMS	7- 20	7 1/8	- 5/8	-8.0
O	ALTOS COMPUTER SYST	8- 21	9 1/8	- 1/4	-3.0
O	AMDAHL CORP	10- 31	10 7/8	+ 1/8	+1.1
O	APPLE COMPUTER INC	18- 63	25 3/8	+2	+7.[illegible]
N	AT&T	15- 21	18 3/8	0	0.0
N	BURROUGHS CORP	46- 59	58 1/8	+1 5/8	+2.8
O	COMPAQ COMPUTER CP	4- 10	8	- 3/8	-4.0
O	COMPUTER AUTOMATION	3- 17	6 7/8	- 1/4	-4.0
N	COMPUTER CONSOLES	8- 28	9 7/8	+ 7/8	+9.4
N	CONTROL DATA CORP	25- 50	30 7/8	-0 1/4	-0.2
O	CONVERGENT TECHNOL.	7- 41	[illegible]	+ 1/8	+0.7
N	CRAY RESEARCH INC	39- 59	60	+ 3/4	+1.4
O	DAISY SYSTEMS CORP	14- 28	21	+0 1/2	+4.0
N	DATA GENERAL CORP	35- 69	58 1/4	-3 3/4	-6.4
N	DATAPOINT CORP	14- 31	14 3/4	+ 7/8	+6.3
N	DIGITAL EQUIPMENT	84-125	104 1/4	+1	+0.9
N	EECO INC	12- 19	13 5/8	+ 1/4	+1.8
N	ELECTRONIC ASSOC.	9- 18	9 1/4	+ 1/4	+2.7
N	FLOATING POINT SYST	16- 40	17	-0 1/8	-0.8
O	FOXBORO	20- 47	31	-0 3/8	-0.2
O	GENERAL AUTOMATION	3- 20	6 7/8	- 1/8	-2.0
N	GOULD INC	21- 40	28	+ 1/4	+1.1
N	HARRIS CORP	25- 40	31 7/8	+ 7/8	+3.0
N	HEWLETT-PACKARD CO	31- 49	38	-3 1/4	-8.7
N	HONEYWELL INC	46- 69	60	+ 1/4	+0.2
N	IBM	100-128	123 1/4	-2 5/8	-2.0
O	IPL SYSTEMS INC	2- 14	3 3/8	- 1/4	-10.0
N	ITT CORP	21- 47	28	-1 1/4	-4.0
N	M/A-COM INC	15- 28	17 3/8	- 3/8	-2.0
N	MANAGEMENT ASSIST	6- 28	27 1/8	+ 5/8	+1.0
N	MATSUSHITA ELEC(ADR)	20- 88	88 1/4	+7	-10.0
N	MODULAR COMPUTER SYS	6- 19	7	- 1/4	-3.0
N	MOHAWK DATA SCI	3- 17	31	+ 3/8	+0.0
N	MOTOROLA INC	29- 49	30 5/8	0	0.0
N	NAT'L SEMICONDUCTOR	11- 20	13 1/4	0	0.0
N	NBI INC	17- 36	17	+ 1/8	+0.7
N	NCR	21- 33	25 1/4	+ 1/8	+0.5
N	PERKIN-ELMER	19- 35	25 1/4	-1 5/8	-6.2
N	PRIME COMPUTER INC	11- 35	21 1/8	- 1/4	-1.0
N	SPERRY CORP	35- 50	37 7/8	-1 1/2	-3.0
O	STRATUS COMPUTER INC	9- 17	9 1/4	- 1/4	-7.0
O	TANDEM COMPUTERS INC	13- 40	17 7/8	-0 1/8	-0.0
N	TANDY CORP	24- 40	28 3/8	0	0.0
O	TELEVIDEO SYSTEMS	3- 40	3 1/4	0	0.0
O	TELXON CORP	9- 17	10	- 1/4	-2.4
N	TEXAS INSTRUMENTS	101-158	121 7/8	+2 3/8	-2.0
O	ULTIMATE CORP	15- 35	20 7/8	+ 7/8	+5.4
O	VECTOR GRAPHICS INC	0- 8	1/4	-3/16	-30.1
O	WANG LABS "B"	20- 40	23 1/4	- 7/8	-0.1
A	WANG LABS "C"	20- 42	23 3/8	- 1/2	-0.7
N	XEROX CORP	35- 50	37 3/8	+ 3/8	-0.0
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	40- 83	31	0	0.0
N	CMI CORP	6- 10	8 3/8	- 3/8	-5.0
O	COMDISCO INC	20- 40	12	0	0.0
N	CONTINENTAL INFO SYS	3- 16	7 1/2	+ 1/2	+1.6
O	DPF INC	10- 26	20	+ 1/4	+1.3
O	FINALCO GROUP INC	4- 13	6	- 1/4	-4.0
O	PHOENIX AMERICAN INC	3- 17	6	- 1/4	-4.7
O	SELECTERM INC	12- 29	20 1/2	0	0.0
N	U.S. LEASING	29- 44	37	+1 1/8	+3.6
	COMPONENTS				
O	ADVANCED MICRO DEV	30- 41	30	-1	-3.0
O	[illegible] SEMICONDUCTOR	16- 30	16 1/2	+ 1/8	+1.0
O	ANALOG DEVICES INC	20- 38	28 3/8	-1 3/8	-5.7
O	ANALOGIC CORP	10- 31	12 1/4	-1 1/4	-8.6
N	APPLIED MAGNETICS CP	3- 27	8 5/8	+ 3/8	+6.0
O	[illegible] CORP	3- 13	8 5/8	+ 1/8	+0.7
O	MICRO MASK INC	10- 18	12 3/8	0	0.0
N	TERADYNE	20- 38	28 3/4	-1 1/8	-4.3
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	3- 8	3	- 1/8	-20.0
N	ADVANCED SYSTEMS INC	10- 23	44 1/4	- 1/8	-1.7
O	AGS COMPUTERS INC	11- 20	11	-3 1/2	-23.0
O	AMERICAN SOFTWARE	10- 31	13 1/4	+ 1/4	+1.0
O	ANACOMP INC	3- 13	2	- 1/4	-11.1
O	ANALYSTS INTL CORP	5- 17	8 1/4	0	0.0
O	APPLIED DATA RSH	10- 37	23	+ 1/2	+2.4
O	ASHTON TATE	8- 13	7	+ 1/2	+7.0
O	ASK COMPUTER SYSTEMS	10- 31	16	- 1/2	-3.0
O	ASTROSYSTEMS CORP	1- 7	1 1/2	- 1/4	-11.1
N	AUTOMATIC DATA PROC	30- 44	33	- 1/4	-1.0
O	COMPUTER ASSOC INT'L	10- 30	17 1/4	0	0.0
O	COMPUTER HORIZONS	8- 20	8 1/4	- 3/8	-3.4
O	COMPUTER NETWORK	8- 11	8 1/4	+ 1/4	+3.0
N	COMPUTER SCIENCES	11- 20	10 7/8	+ 1/2	+4.7
O	COMPUTER TASK GROUP	20- 40	16	- 1/4	-1.0
A	COMPUTER USAGE	3- 10	6 1/4	- 7/8	-14.0
A	COMPUTONE SYSTEMS	3- 25	8 1/2	+ 7/8	+11.0
O	COMSERV CORP	1- 31	3 1/4	+ 1/2	+18.1
O	COMSHARE	7- 14	7 1/8	- 1/4	-3.3
N	CULLINET SOFTWARE	20- 38	28 1/8	-2 1/4	-8.2
O	CYCARE SYSTEMS INC	10- 25	12 1/2	- 1/4	-2.0
O	DUQUESNE SYSTEMS INC	3- 27	9 1/4	- 5/8	-7.0
N	GENERAL ELECTRIC CO	48- 58	57 1/2	- 3/8	-1.0
N	GTE CORP	30- 40	40 1/8	-1 1/4	-3.0
N	INFORMATICS GENERAL	10- 25	20 1/8	- 5/8	-3.2
O	INFORMATION SCIENCE	8- 17	9 1/4	0	0.0
O	INFOTRON SYSTEMS CO	30- 49	20 1/4	+ 3/8	+2.0
O	KEANE ASSOCIATES	8- 18	18	0	0.0
N	LOGICON	18- 31	28 1/4	-3	-9.6
O	LOTUS DEVELOPMENT CO	10- 40	22 1/2	+2 1/2	+12.0
O	MCI COMMUNICATIONS	6- 20	8	- 1/4	-3.0
O	MGMT SCI AMER INC	8- 20	23 1/4	- 3/8	-2.0
O	MATHEMATICAL APP GRP	6- 20	9 1/4	0	0.0
O	MICOM SYSTEMS INC	31- 38	30	+ 1/4	+0.7
O	MICROPRO INT'L CO	3- 10	2 3/8	- 1/4	-9.0
O	[illegible] CP	3- 28	16 7/8	+ 1/2	+3.0
O	NATIONAL DATA CORP	9- 30	8	+ 3/8	+7.2
O	ON-LINE SOFTWARE INC	6- 20	9 1/4	0	0.0
O	PANSOPHIC SYSTEMS	11- 36	21 7/8	0	0.0
N	PLANNING RESEARCH	10- 31	10 5/8	+ 1/4	+2.0
O	POLICY MGMT SYSTS CP	20- 35	30 1/4	-0 1/4	-6.0
O	PROGRAMMING & SYS	4- 8	4 1/8	- 1/4	-2.7
O	REYNOLDS & REYNOLDS	29- 50	38	+1 1/4	+3.0
O	SEI CORP	11- 20	23 1/4	- 1/8	-3.0
O	SHARED MEDICAL SYST	20- 35	30 1/8	-2 3/8	-6.4
O	SCIENTIFIC COMPUTERS	6- 14	8 1/4	- 5/8	-24.0
O	SOFTWARE AG	8- 18	10	+ 5/8	+4.0
N	URS CORP	10- 16	12 1/4	- 5/8	-4.0
O	UCCEL	7- 17	12 1/4	+ 1/4	+20.0
	PERIPHERALS & SUBSYSTEMS				
O	AM INTERNATIONAL	3- 7	3 7/8	0	0.4
N	ANDERSON JACOBSON	4- 20	8 1/4	+ 1/8	-31.3
O	AUTO-TROL TECHNOLOGY	3- 20	8 1/4	-1 1/8	-10.0
O	[illegible] COMPUTING	10- 20	20	0	0.0
O	[illegible] INC	6- 25	8 1/4	- 1/2	-7.0
N	[illegible] INT'L	1- 25	5/8	0	0.0
N	BOLT, BERANEK & NEW.	17- 38	20	- 1/4	-0.0
A	[illegible] CORP	1- 8	2	- 1/4	-11.1
O	CENTRONICS DATA CORP	3- 20	8 5/8	- 7/8	-8.0
O	CETEC CORP	7- 12	7 7/8	- 3/8	-4.0
A	COGNITRONICS	3- 20	4 1/8	- 1/8	-2.9
N	COMPUGRAPHIC CORP	20- 40	20	-1 1/8	-5.0
O	COMPUTER TRANSCEIVER	1- 31	3/8	0	0.0
N	COMPUTERVISION CORP	30- 60	30 3/8	-1 1/8	-3.0
N	CONRAC CORP	11- 20	13 7/8	0	0.0
A	DATAPRODUCTS CORP	10- 23	16 3/4	+ 1/8	+1.0
O	DATARAM CORP	4- 12	4 3/8	- 1/8	-2.7
O	DATA SWITCH CORP	8- 41	8 3/4	- 1/4	-7.0
O	DATUM INC	8- 17	8 1/4	+ 1/4	+6.7
O	DECISION DATA COMPUT	8- 10	20 1/4	-1 1/2	-12.0
O	DOCUTEL-OLIVETTI	3- 35	8 1/8	+ 1/2	+10.0
N	ELECTRONIC M & M	8- 11	8 7/8	- 3/8	-6.0
O	ENDATA, INC	7- 16	7 3/4	+ 1/8	+6.0
O	EVANS & SUTHERLAND	12- 30	12 5/8	- 1/8	-1.0
O	GANDALF TECHNOLOGIES	9- 14	12 1/4	+ 1/8	-0.0
O	GEN. DATA COMM IND	10- 35	14 1/8	+ 1/4	+1.0
N	HAZELTINE CORP	16- 40	20 3/8	-1 1/2	-4.0
O	ICOT CORP	3- 8	4	+ 5/8	+18.0
O	INFORMATION INTL INC	20- 19	11 1/4	- 1/4	-2.1
O	INTECOM INC	7- 31	8 5/8	0	0.0
O	INTEL CORP	27- 49	29	0	0.0
N	[illegible] ELECTRONICS	7- 19	9 1/8	+ 5/8	+0.7
O	MEGADATA CORP	3- 10	12 1/8	+ 1/8	+1.9
O	MSI DATA CORP	6- 23	4 1/2	- 5/8	-9.7
N	[illegible] CORP	16- 28	25 3/8	- 1/8	-0.4
O	NETWORK SYSTEMS CORP	16- 30	20 5/8	-1 1/8	-5.0
N	NO AMERICAN PHILLIPS	30- 40	37	- 1/8	-1.0
N	NORTHERN TELECOM LTD	30- 40	30 7/8	- 7/8	-3.0
O	[illegible]	1- 4	1/8	0	0.0
N	PARADYNE CORP	11- 30	10 1/8	+ 1/8	-0.8
N	PENRIL CORP	3- 10	11 1/8	0	0.0
N	PLESSEY CO (ADR)	20- 41	38 1/4	+ 1/2	+1.0
O	PRINTRONIX INC	10- 30	20	- 1/4	-1.2
O	[illegible] CORP	6- 28	9	+ 1/4	+2.9
N	RECOGNITION EQUIP	10- 19	13 3/8	+ 1/8	+3.7
N	ROLM CORP	30- 50	30 3/8	- 1/4	-1.8
N	SANDERS ASSOCIATES	30-130	30 3/8	- 3/8	-0.0
O	SCAN DATA	1- 8	1/8	+ 1/8	-33.0
O	SCAN-TRON CORP	6- 20	11 3/4	0	0.0
N	SCIENTIFIC ATLANTA	9- 21	9 1/4	+ 1/8	+0.7
O	SEAGATE TECHNOLOGY	8- 20	6 5/8	- 1/8	-0.7
N	STORAGE TECHNOLOGY	3- 28	3 1/8	- 7/8	-21.2
O	SYKES DATATRONICS	3- 13	1 5/8	- 1/4	-8.8
O	SYSTEMS & COMP TECH	30- 38	23 1/4	- 5/8	-2.0
O	T BAR INC	7- 17	7 1/8	- 3/8	-4.2
O	TAB PRODUCTS CO	10- 20	18 1/2	0	0.0
N	TANDON CORP	7- 20	3 3/8	-0 1/8	-14.5
O	TEC INC	8- 20	8 1/8	- 1/4	-2.6
N	TEKTRONIX INC	50- 83	58 7/8	-4 7/8	-8.7
N	TELEX	19- 50	48	-3 1/4	-6.7
O	[illegible] SYSTEMS CO	3- 47	8 1/4	- 1/4	-20.0
N	TIMEPLEX INC	10- 20	19 3/4	0	0.0
O	VISUAL TECHNOLOGY	3- 20	2 3/8	- 1/4	-4.3
	SUPPLIES & ACCESSORIES				
N	AMERICAN BUS PRODS	17- 28	25	+ 1/8	+0.2
O	BARRY WRIGHT	20- 28	23 1/4	-1	-3.0
N	DUPLEX PRODUCTS INC	20- 23	30 1/4	0	0.0
N	ENNIS BUS. FORMS	10- 20	20 3/8	- 1/8	-0.9
N	3M COMPANY	60- 90	80	- 3/8	-0.9
N	MOORE CORP LTD	30- 35	30 3/8	+1 1/4	+3.6
O	STANDARD REGISTER	27- 43	43 1/2	+ 1/4	+0.6
N	WALLACE COMP SERVICE	20- 33	25 3/8	+ 1/8	-0.0

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

VS.